

# **Reviewing Global Internet Governance Capacity Development and Identifying Opportunities for Collaboration**

***Final Report***

*Prepared by DiploFoundation researchers led by  
Ms Marilia Maciel and Mr Alan Finlay  
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## IMPRESSUM

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E-mail: [diplo@diplomacy.edu](mailto:diplo@diplomacy.edu)

Website: [www.diplomacy.edu](http://www.diplomacy.edu)

Authors: Marília Maciel, and Alan Finley

Editing: Jelena Dinčić

Visualisations: Aye Mya Nyein

Layout and design: Viktor Mijatovic

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## **Quick facts and figures about the research:**

**70 organisations included in the mapping**

**120+ initiatives of IG capacity development researched**

**16 in depth interviews for collecting complementary data and documenting practices**

**Visualisation tool: online interactive charts for an easy visualisation of the results**

# Introduction: background and justification

Technology fosters human development, innovation and economic growth. The ICT sector, in particular, provides the foundation for the digital economy and plays a key role in innovation. ICTs also underpin the evolution of the most important technological and business trends, such as big data, artificial intelligence and the growth of the Internet of Things.<sup>1</sup> It is estimated that by 2020 the number of connected devices will reach 50 billion,<sup>2</sup> causing a profound change in the global economy.<sup>3</sup>

These developments are paralleled by an exponential growth in global connectivity, evidenced by the number of mobile subscriptions, which has reached 7 billion, and the number of Internet users, which accounts for approximately 3 billion, according to statistics provided by the International Telecommunications Union (ITU).<sup>4</sup> In spite of the recent progress, access to ICTs alone cannot foster inclusion and development if knowledge and skills are not in place. Capacity development is necessary to provide the skills that will enable people to use ICTs to benefit their lives and to participate in the digital economy.

One of the barriers to harnessing the full potential of technology for fostering commerce, economic growth and the achievement of the Sustainable Development Goals (SDGs) is that technological advancements require constant training and re-skilling. Technological change also impacts the job market and reinforces the importance of lifelong learning. Automation will erode jobs that consist of routine tasks, usually performed by workers with pre-tertiary education, while it will create jobs that require greater cognitive skills. In this context, capacity development has become even more important.

The rapid evolution of technology and ICTs in the field of Internet governance (IG) led to increase in the scope and level of complexity. The field now encompasses matters related to the technical administration of the network, and to an ever growing myriad of issues related to policy and

regulatory realms. The need for capacity development, a precondition for meaningful involvement in the decisions about the future of technology, is paramount.

Although capacity development is a priority among all stakeholder groups, it is a challenge to obtain an all-encompassing picture of the initiatives that are available. The formats of capacity development are varied and the information about them is dispersed. There is not a one-stop-shop that will help to navigate the impressive volume of capacity development being provided by different stakeholder groups. As a consequence, it is also hard to assess to which extent emerging Internet policy issues are being covered by existing capacity development initiatives.

The International Telecommunications Union (ITU) commissioned the present study with the aim of enhancing the understanding about the need for and the supply of capacity development. In 2014, the World Telecommunication Development Conference (WTDC) acknowledged that enhancing capacity building of the ITU membership in international IG is one of the priority issues to be addressed by ITU's capacity building programme over the next four years. This clearly demonstrates an interest on the part of the ITU membership to pay particular attention to capacity development as an integral part of the IG discussions.

In September 2016, on the occasion of the Global ICT Capacity Building Symposium held in Nairobi, the ITU organised a pre-event on 'Capacity building in Internet governance', with the participation of several IG stakeholders. As an outcome of this event, delegates urged the ITU to continue to work with all stakeholders to advance capacity building in IG.

This report echoes this call and presents an assessment of the status of existing capacity development in IG. It includes the findings of an analysis conducted on a sample of capacity development initiatives offered by five key stakeholder groups<sup>5</sup>: the technical community, the academic sector, civil society, the private sector and International organisations. For the purpose of this research, only initiatives that present a global or regional scope were taken into account. Capacity development offered by national governments, therefore, has

<sup>5</sup> The key IG stakeholders have been identified in paragraphs 35 and 36 of the Tunis Agenda, one of the outcome documents of the World Summit on the Information Society (2005).

# Annex III: List of interviewees

We would like to acknowledge and express our deep appreciation to the following community members and experts who agreed to being interviewed for this research:

Olga Cavalli, South SSIG

Adrian Carballo, South SSIG

Sandra Hoferichter, Euro-SSIG

Hanane Boujemi, Hivos/MENA

Fahd, Batayneh, MEAC-SIG/ICANN

Adam Peake, ICANN

Phet Sayo, IDRC

Jari Arkko, IETF

Pablo Hinojosa, APSIG

Toral Cowieson, ISOC

Niel Harper, ISOC

Konstantinos Komaitis, ISOC

Parminder Jeet Singh - ITforChange

Dominique Lazanski, GSMA

Belinda Exelby, GSMA

Laura deNardis, American university

Dmitry Epstein, Department of Communication at Cornell University

Elizabeth Thomas-Raynaud, ICC BASIS

## Annex II:

# Questions developed to assess the capacity development initiatives (CB):

### 1. General questions about the organiser:

Organisation that provides the CB  
Stakeholder group  
Region  
Capacity development initiatives description

### 2. About each CB initiative:

Nature of the initiative (course, school, briefing, etc.)  
Year of creation  
Language of materials/delivery  
Online, face-to-face or blended  
Target audience (stakeholders)  
Target audience (policy makers, activists, academics), etc.  
How are participants selected?  
Class size (average) or number of participants per year  
Any info on gender balance in the programmes conducted so far

If face-to-face:

- Duration
- How is the programme delivered? (i.e. lectures, simulations, placements, etc)
- What types of supporting materials are provided (texts, videos, etc) and how are they provided (paper, online, etc)
- Are materials copyright protected?
- Are the materials developed by the organiser, or commissioned from others?
- Are the materials focused on regional priorities / local context or applied unchanged across regions?
- How often are materials updated?

Is there a certificate of completion.  
What is the 'value' of the certificate  
Outcome (what should participants be able to do after the CB)

### 3. About the content of the CB

Baskets covered (see GIP division of baskets)  
Topics covered in each basket (list them)  
Relative weight of the baskets (let's agree on a scale, from 1 to 4)  
Relative weight of the topics (let's agree on a scale, from 1 to 4)

### 4. Regarding follow-up activities

After the course, do the participants feel they are part of a corpus – ex: alumni?  
Do the course organisers remain in contact with former participants?  
Is there a follow-up to the programme (e.g. for most deserving participants)?

If online:

- What are the technical requirements to access it?
- Is the CB platform adapted to the mobile environment?
- What methodology is used. Is it self-paced or do participants move through materials as a group?
- Are participants grouped into cohorts or classes which start at the same time?
- Do participants interact, and if so, how?
- Is there a tutor or facilitator?
- What types of materials are used (texts, videos, etc.)
- Are materials copyright protected?
- Are the materials developed by the organiser, or commissioned from others?
- Are the materials focused on regional priorities / local context or applied unchanged across regions?
- How often are materials updated?



Figure 1. The complexity of capacity development

not been included. In spite of that, it is important to emphasise the role of governments in establishing the policy framework and conditions for skills development at a national level and in providing support for capacity development initiatives.

The report includes capacity development initiatives based on public-private and other kinds of partnerships. Increasingly, capacity development is not offered by one stakeholder group in isolation. Throughout the report, there are examples of initiatives in which two or more stakeholder groups act together and provide resources – enabling conditions, financial support, or expertise, for example, for the initiative to flourish. This report aims to provide information that will facilitate identifying gaps in capacity development and fostering synergies and collaboration among stakeholder groups in the provision of capacity development on IG in the future.

The report is structured around four chapters. Chapter 1 makes an overview of the trends in the IG policy landscape, in the fields of Infrastructure, Security, Human Rights, Legal issues, Economic issues, Sociocultural aspects, and Development issues. Chapter 2 maps the initiatives on capacity development through a sample of leading organisations representative of all regions and stakeholder groups. It presents quantitative findings and qualitative findings which match the curricula adopted with the thematic areas identified in chapter 1. Chapter 3 provides an analysis of supply and demand for capacity development, highlighting the strengths, weaknesses, gaps, and opportunities. Chapter 4 makes recommendations and suggests potential actions to be taken by ITU. Annex I presents an overview of the methodological approach adopted in this research. Chapter 1: The evolving Internet governance landscape

# Chapter 1:

## The evolving Internet governance landscape

This chapter identifies trends in IG. It aims to highlight the digital policy topics that are gaining importance and should be taken into consideration in capacity development initiatives, in order to prepare students for the emerging challenges. This analysis provides the background against which the strengths and gaps in existing capacity development initiatives will be assessed (chapter 3).

Since the World Summit on the Information Society, the term 'Internet governance' has been broadened beyond narrow technical concerns to include a wider range of Internet-related policy topics, ranging from legal to societal and cultural issues. At the same time, it is important to highlight that some topics which are considered technical also have a governance dimension. The importance of standards to policy development, for example, should not be downplayed. Different choices of standards may uphold or undermine certain values and rights. This holistic understanding of IG, which places equal weight of technical and non-technical aspects, underpins this report.

Logically, it requires more time, and greater resources and planning than training.

The various levels where capacities are developed and needed are visualised through the capacity development butterfly (based on the methodology used by the Swiss Agency for Development and Cooperation).<sup>6</sup>

The effectiveness and legitimacy of IG depend on the capacity of nations, organisations, and individuals to participate fully in IG policy processes. Capacities refer to their abilities 'to define and solve problems, make informed choices, order their priorities, plan their futures, and to implement programmes and projects to sustain them'.<sup>7</sup>

The need for capacity development has been an underlying feature in IG since the WSIS 2003–2005 outcome documents, which underscored capacity development as a priority for developing countries. Likewise, the 2015 WSIS+10 outcome document calls for further investment in capacity development.

### Capacity development or capacity building

*Capacity development and capacity building are two terms often heard in development discussions. The former refers to developing existing endogenous capacities and skills that are present in all countries, while the latter is used more in reference to a process of starting from scratch and building something that has not existed previously. Capacity development is more widely used in current development parlance.*

### Terminology: Capacity development and training

While there is agreement about the importance of capacity development, there is little understanding about what it includes. Moreover, capacity development is often used as a buzzword. Our study shows that the way in which the terms capacity development and training are used, are often interchangeable. Capacity development is a broader concept, which goes beyond training. Capacity development is about change and transformation. Capacity also needs to be understood at various levels: while training often results exclusively in the building of individual competencies (skills and know-how), capacity development aims at creating a sustainable impact on organisations and networks.

Research on capacity development in general and experience from the IG field lead towards the following highlights:

- While the Internet is a global facility, Internet policy is often very local. It is shaped by local cultural and social specificities (e.g. cultural sensitivity for content, relevance of privacy protection). Thus, capacity

<sup>6</sup> Swiss Agency for Development and Cooperation (2006) Capacity Development in SDC. Available at [https://www.eda.admin.ch/content/dam/deza/en/documents/die-deza/strategie/202114-capacity-development-sdc\\_EN.pdf](https://www.eda.admin.ch/content/dam/deza/en/documents/die-deza/strategie/202114-capacity-development-sdc_EN.pdf) [accessed 19 February 2017].

<sup>7</sup> Swiss Agency for Development and Cooperation (2006) Glossary Knowledge Management and Capacity Development. Available at [https://www.eda.admin.ch/dam/deza/en/documents/publikationen/glossar/157990-glossar-wissensmanagement\\_EN.pdf](https://www.eda.admin.ch/dam/deza/en/documents/publikationen/glossar/157990-glossar-wissensmanagement_EN.pdf) [accessed 19 February 2017].

# Annex I:

## Methodology

In order to conduct an assessment of the supply of capacity development in the field of Internet governance, a sample of organisations from five of the key stakeholder groups – the Internet technical community, the academic sector, civil society, the private sector and international organisations – was selected. The selection was based on desk research and interviews.

A questionnaire was developed to assess the capacity development initiatives provided by these organisations (see Annex II). The questionnaire included four sections: 1) general questions about the organisation responsible for the capacity development initiative; 2) general questions about the capacity development (assessing online, face-to-face and hybrid methodologies); 3) questions regarding the course materials; 4) questions concerning follow-up activities, including certification.

The answers were gathered primarily by means of desk research. A number of interviews were also conducted with key organisations in the field in order to clarify the information that was made available online or to obtain information which was not clearly available.

The analysis of the themes covered by the capacity development initiatives was based on matching the syllabus of courses against the seven IG baskets (see chapter 1). This allowed the identification of the baskets (and the subtopics belonging to these baskets) that are currently being addressed. This information was tabled for easy visualisation (see Annex III), allowing an assessment of the thematic coverage by each organisation. On an aggregated level, the information was clustered to generate bar charts. The aim of the charts is to show the level of coverage of baskets/subthemes by each stakeholder group. All the charts and visualisations produced for this report, which are highly interactive, can be assessed online. The online versions provide additional information (mostly through mouse-overs).

Opportunities for collaboration are also indicated in the tables developed for chapter 3. These tables identify gaps in the coverage of policy trends mentioned in chapter 1. They also mention the organisations working in topics that are closely related to these policy trends. Their work could be leveraged to fill the gaps in capacity development.

- Updating of course materials at least once a year, or more often if the course deals with a particularly dynamic topic.
- Facilitating dialogue on how to build capacity for the use of technology such as big data and IoT evidence-based policy development and for the social good.
- Encouraging the development of courses which present a flexible programme that can be easily adjusted to local and regional issues and needs. This is particularly important in face-to-face courses.
- Reaching out to actors that are not sufficiently benefiting from current initiatives, such as policymakers, legislators, and marginalised groups.

As a general and final remark, it is important to emphasise that capacity development is increasingly not offered by one stakeholder group in isolation. When stakeholder groups act together, they are able to provide the necessary resources for the initiative to flourish. Cybersecurity is the field that shows the most collaboration among different sectors - such as governments, companies and the academic sector - in the provision of capacity development. Other thematic areas could follow a similar approach.

Table 14: highlights from the recommendations, issues and potential partners

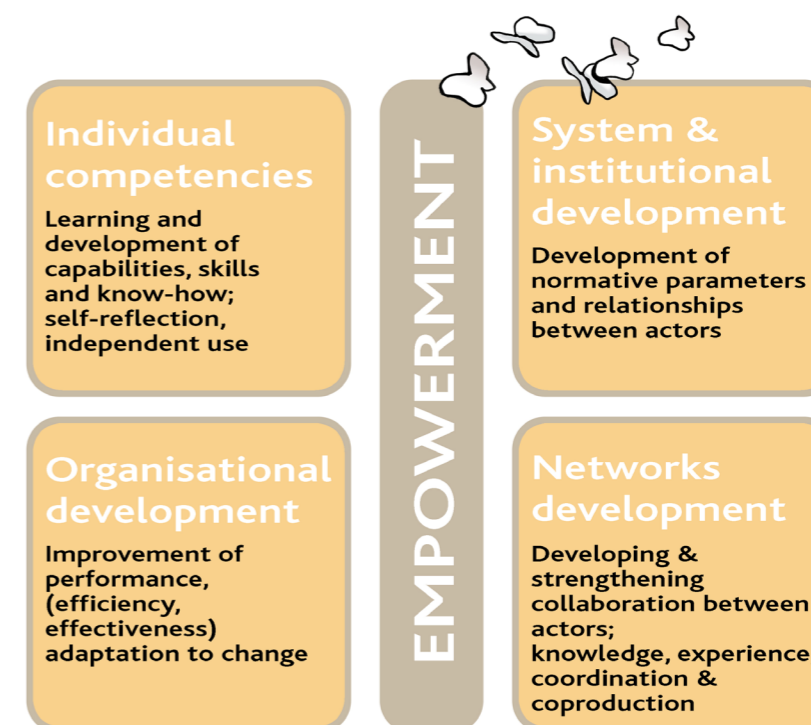


Figure 2. Capacity development butterfly

development should follow local dynamics, taking into consideration local political, social, cultural, and other specific conditions in developing and implementing capacity development programmes and activities.

- The urgency for capacity development could be addressed by providing just-in-time learning as a part of policy processes. The growing need for capacity in the digital policy field has to be addressed at a more systemic level, by including IG and related topics in the curriculum of academic post-graduate studies.
- Genuine and sustainable empowerment can be achieved through holistic capacity development on individual, organisational, system, and network levels, as visualised in the capacity development butterfly.

This study identified many training activities, but less programmes that provide additional elements of capacity development (e.g. institutional development, network creation, etc.).

In order to conduct this analysis, IG topics have been clustered according to the IG taxonomy – into seven thematic baskets.<sup>8</sup> The IG taxonomy has been evolving since 1997 when it consisted of 5 baskets: infrastructure, legal, economic, development and socio-cultural. In 2014, security and human rights baskets were added forming the current version of the IG taxonomy. These baskets have also been adopted in the report Mapping of International Internet Public Policy Issues,<sup>9</sup> commissioned by the Working Group on Enhanced Cooperation, created under the auspices of the UN Commission on Science and Technology for Development,

and was adopted by the Global Internet Policy Observatory (GIPO) of the European Commission.

IG issues are sorted into seven baskets based on their main policy characteristics. However, most issues are of a multidisciplinary nature. For example, the governance of data involves technological, economic, human rights, and security considerations. Data standards, set by the technical community, could impact the security, economic, and human rights aspects of data governance. The level of privacy protection could affect flexibility when it comes to processing user data, the core of the pillars of the Internet industry business model. Multidisciplinary aspects are numerous. The multidisciplinary approach is one of the main success factors for capacity development and training programmes in the IG field.

## 1. Infrastructure

The infrastructure basket includes three issue-areas that are concerned with the core functionality of the Internet. These are: a) the telecommunications infrastructure that facilitates digital communication; b) technical issues related to standards and critical Internet resources: technical and web standards, Internet Protocol (IP) numbers, the Domain Name System (DNS), and the root zone; and c) cross-cutting issues, including net neutrality, cloud computing and the Internet of Things.

In each of these areas, significant changes can be noticed, such as the emergence of new players in the provision of connectivity, an increasing number of attempts to tamper with Internet architecture in order to achieve policy and legal enforcement, and the rapid development of new technologies enabled by ubiquitous connectivity and big data, such

<sup>8</sup> The term 'basket' was introduced into diplomatic practice during the Organization on Security and Cooperation in Europe (OSCE) negotiations.

<sup>9</sup> [http://unctad.org/meetings/en/SessionalDocuments/ecn162015crp2\\_en.pdf](http://unctad.org/meetings/en/SessionalDocuments/ecn162015crp2_en.pdf)

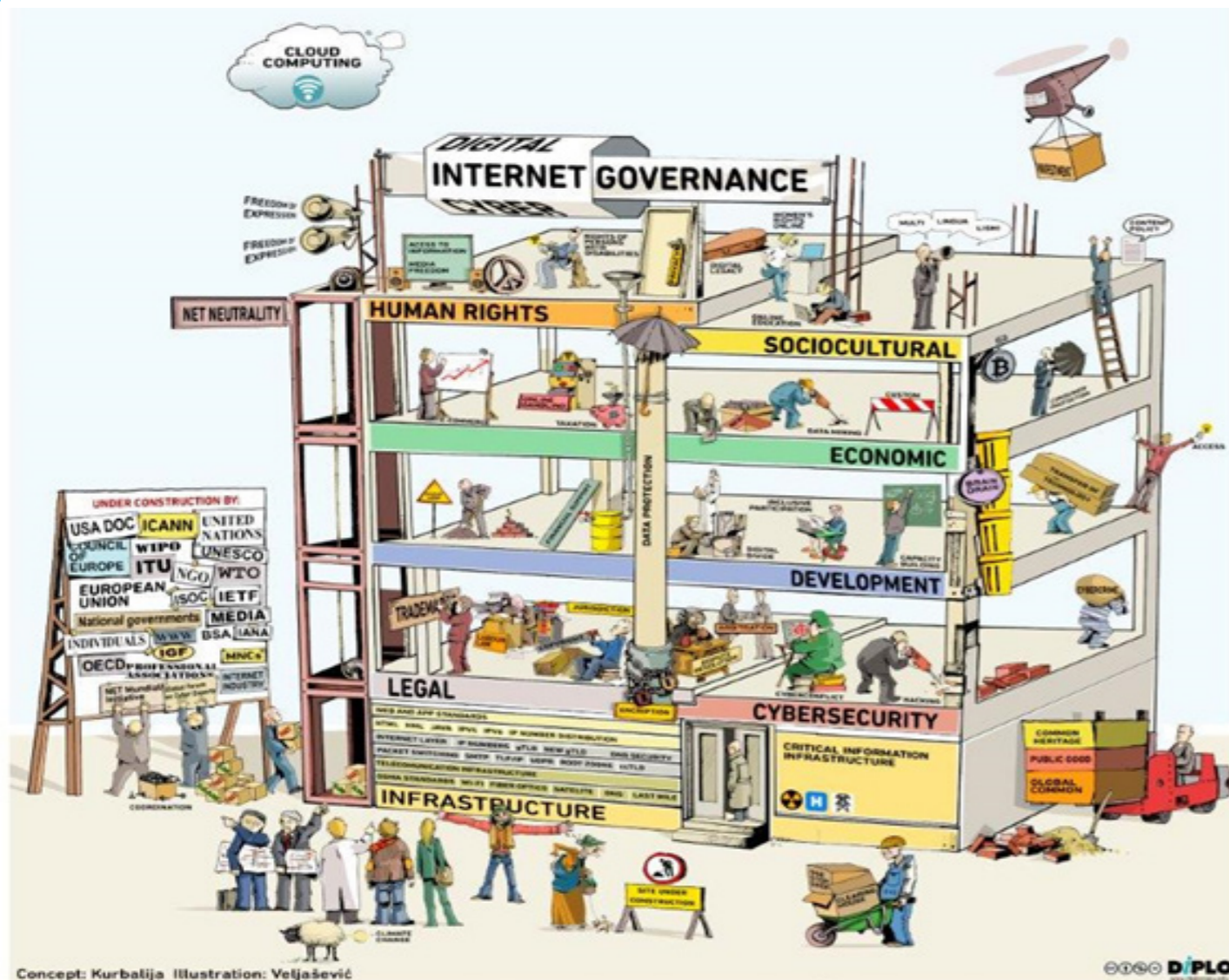


Figure 3. IG building in construction

as artificial intelligence and the Internet of Things, which are under scrutiny from legal, ethical, and human rights standpoints. Capacity development covering infrastructure aspects should introduce some reflection on the new actors, regulatory initiatives and societal challenges that these changes introduce.

The following trends can be identified in the fields of infrastructure:

**Major Internet companies, such as Google and Facebook, have started to play a key role in the deployment of Internet infrastructure.** These companies have been acquiring parts of the infrastructure or participating in the process of building new connections. Asian Telecom and Google, for example, have established a partnership to build one of the main cables connecting the United States and Japan. Many other projects are underway, such as a Google-sponsored cable between Florida and Brazil and a cable between Virginia, in the United States, and Bilbao, in Spain, a joint endeavour by Facebook and Microsoft. Internet companies have also started to provide connectivity using innovative technologies, such as drones and balloons.

**Concerted efforts are underway to facilitate 5G spectrum allocation, deployment and standardisation.** These faster and smarter networks will enable the computing power necessary for the development of the Internet of Things and interconnected smart cities. Milestones for the 5G standardisation process have been put forth by the ITU. They inspired important policy processes, such as the European agreement on the use of the 700 MHz band, crucial in the deployment of 5G technology.<sup>10</sup>

**Governments have increasingly intervened in the Internet infrastructure as part of law enforcement measures.** This included the imposition of restrictions on Internet infrastructure within their jurisdictions, with the possible negative impact on Internet functionality and availability. Domain name seizures are also growing in number.<sup>11</sup> Such measures also lead to collateral unintended consequences, such as the disruption of connectivity and the accessibility of

<sup>10</sup> [http://europa.eu/rapid/press-release\\_IP-16-4405\\_en.htm](http://europa.eu/rapid/press-release_IP-16-4405_en.htm)  
<sup>11</sup> In November 2016, over 4500 domain names were seized for selling counterfeit products in a global operation coordinated by Europol, Interpol, and the US National Intellectual Property Rights Coordination Centre.

Table 14: Highlights from the recommendations, issues and potential partners

Key recommendation for the ITU	Key issues to be addressed	Potential partners/ who to include
Convene a multistakeholder discussion to address gaps and bottlenecks in IG capacity building	How to ensure comprehensive and sustainable capacity development	Multistakeholder, sector and regional balance
	How to strengthen a multidisciplinary approach to capacity development in IG across stakeholder groups.	
	Practical challenges to course certification in different countries and regions.	
	How to address gender imbalances in IG capacity development, including in the selection process for course participants.	
Convene a cross-regional discussion with universities to address key gaps identified	The practical feasibility of creating regional networks of academic supervisors in IG.	University IG capacity building initiatives mapped in this research
	The need for IG courses at different levels of certification at universities.	
	The portability of credit across academic institutions and stakeholder groups.	
Develop a training programme for facilitators and trainers of IG capacity building initiatives in the ITU Academy	The need for skilled facilitators for both online and offline capacity building initiatives.	DiploFoundation Stanford University HarvardX EdX MIT
Fund or support the development of open license course content	The need for course content that encourages a rights-based approach to technology and infrastructure development, and deals with public interest and developmental aspects of topics covered in IG capacity building initiatives.	UC Berkeley Harvard University HIIG, University of Berlin Central European University Link Centre DiploFoundation APC
	The need for course content that presents technical aspects in an easy manner to decision-makers, showing the interplay between technical and policy options.	CTO ICANN AFRICAN DiploFoundation University IG capacity building initiatives mapped in this research
	The need for course content that deals with the rights of women and children in the context of IG.	APC's (particularly its Women's Rights Programme) UN Women UNICEF
	The need for online multilingual content for IG capacity development.	WIPO, ITU, W3C (as good models to consider)
Commission further research to encourage innovation in IG capacity development	The need for a study that maps innovation in online learning methodologies across different sectors, institutions and fields. This would serve as a baseline document to convene discussions and stimulate innovation amongst stakeholders in learning methodologies.	Consultants
	The need for online learning platforms to be compatible with the mobile environment. The ITU should conduct a specific needs assessment study that details the bottlenecks, gaps and opportunities in developing mobile-friendly course content given the mobile readiness of the target audiences of IG courses.	GSMA

- The inclusion of courses that cater for the needs of beginners, intermediary, and advanced participants in the ITU's capacity development initiatives.
- In the case of intermediary and advanced courses, the availability of a course facilitator who interacts with the students with the aim of enhancing learning and decreasing drop-out rates.
- If students are expected to move forward through the course materials as a group, the establishment

- of weekly modules or milestones seems to be a good practice to keep participants on the same page and motivated.
- Courses that provide a mix of reading materials and practical exercises that facilitate the application of the knowledge acquired in real-life situations.
- Certification, which is an important asset for the students. Accreditation of certificates facilitates their recognition by potential employees.



emerging issues. Course content for IG capacity development should not be standardised to the extent that it does not allow regional or local initiatives to respond to their specific needs at any given time. For example, in LAC, the South IG school lets the stakeholder community identify issues that are important. In Asia, a call for lecture proposals is issued by APSIG. Course content should reflect something of the fluidity of the IG space, and in this respect is likely to be incomplete, explorative and uncertain at any given time.

## Conclusion

This report identified trends in the IG policy landscape and provided an analysis of supply and demand for capacity development. It highlighted gaps and opportunities and presented some recommendations. This last section summarises some of the key findings of the report and makes suggestions for the way forward with regards to ITU's engagement on capacity development. They should be read in conjunction with the recommendations provided in chapter 4.

### Thematic coverage

The following topics are well-covered by existing capacity development initiatives:

- Propaedeutic approach to Internet governance and basic explanation of how the Internet works.
- In-depth technical knowledge on topics such as telecommunications, IP, DNS, standards and protocols.
- Capacity building initiatives that address the potential of technology and the Internet to strengthen citizens' participation.
- Among the IG baskets, cybersecurity is the one receiving the most attention in capacity development.
- Legal issues are particularly present in academic initiatives of capacity development, especially in general courses on law and technology, or law of communications. Capacity development on intellectual property also stands out.
- Among the human rights included in this mapping, the right to privacy is the most covered in capacity building initiatives across all stakeholder groups.

A number of gaps have been identified in capacity development initiatives. More attention should be given to such gaps. The following is suggested:

- A transversal human rights approach needs to be adopted. There is a need to correlate capacity development on areas such as standards, the IoT or economic issues, for example, with their human rights' implications;
- Technical and policy aspects need to be accessed in conjunction. In capacity building initiatives dedicated

to Internet infrastructure, for example, it is possible to notice a disconnect between the technical and public policy aspects involved;

- There needs to be better understanding of the infrastructure that enables future networks and that supports technological developments such as the IoTs;
- Legal implications of cloud computing and the opportunities and challenges posed by increased data flows also need to be better understood;
- Capacity building on security needs to address, in a more sufficient way, the governance aspects of cybersecurity policy development, from the process of crafting national cybersecurity frameworks to the need to foster multistakeholder involvement;
- Some legal aspects deserve more attention, including: jurisdiction, labour law, and emerging issues, such as the law of robotics;
- Economic issues, such as e-commerce, consumer protection, taxation and virtual currencies, need to be covered more;
- The impact of the use of technologies such as algorithms on socio-cultural rights needs to be addressed;
- Digital literacy should be provided in order to strengthen citizen participation, the participation of migrant and displaced communities in governance structures, and to strengthen democracy more generally;
- Capacity building should improve service delivery to citizens, migrants and displaced communities through e-government, e-health and e-education;
- The use of emerging technologies, such as big data and the IoTs for achieving the objectives of public policy and in the public interest, should be addressed.

Taking into account these points as well as the recommendations and suggestions made on chapter 4, the ITU could further consider:

- A dialogue among key providers of online capacity development in order to identify good practices in terms of methodology. Some of these good practices could be adopted by the ITU Academy.
- Without prejudice of the online capacity building initiatives offered through ITU Academy, the strengthening of the face-to-face component of its capacity development by establishing partnerships with organisations that provide this type of training, such as RIRs, some private sector organisations (e.g. GSMA, Microsoft) and civil society organisations with local grassroots presence.
- Assisting in filling the thematic gaps in capacity development, particularly when it comes to infrastructure issues and their interplay with development. The organisations identified in Table 7, which correlates policy trends, capacity building gaps, and actors working in infrastructure issues (chapter 3) could be considered as potential partners.

services in other jurisdictions, as well as the risk of Internet fragmentation.

**There is a clearer perception of the interrelation between technical standards, ethics and human rights.** For example, the Institute of Electrical and Electronics Engineers (IEEE), has published the draft guide 'Ethically Aligned Design: A Vision for Prioritizing Human Wellbeing with Artificial Intelligence Autonomous Systems' aimed at encouraging technologists to prioritise ethical considerations in the creation of autonomous and intelligent technologies. A Human Rights Protocol Considerations Research Group has been created in the Internet Research Task Force (IRTF) to research whether standards and protocols can enable, strengthen or threaten human rights. The breaking of silos between technical issues and societal considerations facilitates a transversal approach to human rights. Capacity development on technical aspects that have policy implications could benefit from the inclusion of an ethical and human rights analysis.

**Organisations are intensifying their efforts to encourage IPv6 adoption.** IPv6 adoption is important for many reasons, including enabling the development of the Internet of Things. The Results of a survey that looks at how ISPs deploy IPv6 shows that there are certain regional leaders when it comes to IPv6 adoption: the United States in the ARIN region, Belgium in the RIPE NCC region, Brazil in LACNIC, and Japan in the APNIC region, while there seems to be almost no IPv6 deployment in AFRINIC. The global average level of IPv6 deployment is at around 7%, according to APNIC. Capacity development that fosters IPv6 deployment should be further encouraged.

**The implementation of the network neutrality principle remains under discussion.** Although more national and regional norms about network neutrality have been introduced, new price differentiation and zero rating practices trigger discussion. This is one of the most controversial IG policy and regulatory issues, because it involves a careful balance between preserving innovation and the possibility to create new business models, while preserving competition and the rights to information and expression.

**Over-the-top services (OTTs) are being discussed in several regions from legal, economic and infrastructure standpoints.** On the one hand, messaging platforms such as Facebook, Viber and WhatsApp enable people to make free calls and send short messages, in a similar manner that telecommunications services do. In Europe, for example, the proposal of an EU Electronic Communications Code aims to introduce new legal obligations for providers of OTTs that use telephone numbers to allow end users to reach each other (i.e. to call phone numbers/be reachable via a phone number). They are to become subject to the same rules applicable to traditional Telecom operators, such as the obligation to provide contractual information to their customers and switching and emergency call rules. On the other hand,

these platforms are responsible for a large amount of data traffic and there is mounting pressure for them to contribute to infrastructure development.

**The global cloud computing market is accelerating.** Companies are increasingly looking at cloud computing as a viable place to run their core business applications. Nevertheless, according to a study conducted by the IDC and sponsored by Cisco, most organisations (69%) do not have mature cloud strategies. Most of the growth will come from large cloud service providers such as Amazon, Microsoft, Google, and IBM, which are continuously opening new data centres, as they try to comply with data localisation requirements. Other aspects related to IG such as data sovereignty claims and the need to comply with data protection and security regulations are additional incentives for cloud service deployment. Capacity development in the area could help small and medium organisations develop their cloud strategies and could tackle the policy and legal issues raised with cloud computing.

**There is increasing interplay among three technology sectors – AI, IoT, and big data.** The elements of this triad reinforce one another, and capacity development initiatives should take into account this emerging ecosystem. First, AI provides 'thinking' for IoT devices and gadgets. It is what transforms cars, for example, from simple vehicles operated by a driver to intelligent driverless vehicles. AI will empower a wide range of tools from vacuum cleaners to toothbrushes and even automated personal assistants. Second, smart devices and the IoT generate a lot of data, sometimes labelled as big data, which is used for data analysis. Insight from data generated by users is the cornerstone of the business model of the major Internet companies (Google, Facebook, Twitter). Third, the circle is closed by the verification of initial AI algorithms based on user-generated data gathered through smart devices. In addition, data analysis identifies new cognitive patterns that could be integrated into new AI algorithms.

**The implications of automation and artificial intelligence (AI) are being increasingly discussed.** The myriad of concerns includes: minimising the possibility of bias being accidentally built into AI systems; ensuring decision-making transparency for AI systems; instigating methods that can verify that AI technology is operating as intended and that unwanted, or unpredictable, behaviours are not produced and assessing the impact of automation and artificial intelligence on the job market.

**The Internet of Things will continue its trajectory of growth.** It is estimated that by 2020 the number of connected devices will reach 50 billion, causing a profound change in the global economy. This change will largely derive from the fact that the lines between the digital industries and industries that are primarily physical, such as agriculture, construction, transport and manufacturing will increasingly blur. IoT will

bring the latter closer to the cyber world and will radically change their way of making business. At the same time, it will allow the largest software companies to make a shift to the physical world. The IoT creates the need for multidisciplinary capacity development in areas ranging from communications infrastructure, standards, security aspects and human rights.

## 2. Security

Security is among the main concerns of governments, Internet users, technical and business communities. Cyber-threats and cyber-attacks are on the increase, and so is the extent of the financial loss. Cybersecurity came into sharper focus with the Internet's expansion beyond the circle of the Internet pioneers. The Internet reiterated the old truism that technology can be both enabling and threatening: what can be used to the advantage of society can also be used to its disadvantage. Security is an umbrella concept covering cybersecurity, critical information infrastructure protection, cybercrime, cyber conflict, child safety, spam, encryption and digital signatures. The following trends can be identified in the field of cybersecurity:

**Security concerns related to the Internet of Things (IoT) connected devices are increasing.** Governments are starting to consider developing regulation and companies are putting in place new strategies. Following the large-scale cyber-attacks involving the use of Internet-connected devices and routers that happened in the last trimester of 2016, the US Congress held a hearing on 'Understanding the Role of Connected Devices in Recent Cyber Attacks' and experts asked for governmental intervention, in the form of regulations and public policy to improve IoT security. The US Department of Justice (DoJ) created a threat analysis team tasked with studying potential national security challenges posed by Internet-connected devices, such as terrorist threats. The industry is also responding and Cisco, for example, plans to improve IoT security by adapting networks and certifying devices. A survey conducted in Europe revealed that, while most enterprises are aware of the business opportunity presented by the IoT, they also lack an understanding of how to adequately address the associated security risks.

**Distributed Denial of Service (DDoS) attacks continue to increase in size, frequency, consistency and complexity.** The largest attack size peaked at over 250Gbps, after two years of keeping at around 200Gbps. The majority of DDoS attacks now use multiple attack types, making them more sophisticated. While all the sectors seem to be targeted, IT services, cloud computing and software-as-a-service are the top targets, followed by financial services and the public sector.

**National cybersecurity strategies are being developed or improved to face cyber threats.** In Europe, the UK is an example of a country that has adopted a comprehensive National Cyber Security Strategy built around three main pillars: defending its infrastructure, deterring criminals and developing its cyber-capabilities.

**At the international level, cyberspace is increasingly seen as the fourth military operational domain, in addition to air, land and sea.** This comes as a recognition that most conflicts will have a cyber dimension, which is corroborated by the development of national cybersecurity strategies. Within NATO, the practical implications of this decision mean that a cyber-attack on a member state can trigger collective defence by any means (as in Article 5 of the NATO Treaty).

**Bilateral cooperation on cybersecurity is increasing between countries.** An interactive map of bilateral agreements and initiatives for cooperation on cybersecurity can be found here. At the margins of the 2016 BRICS Summit taking place in Goa, for example, India and Russia signed a cybersecurity agreement covering cybercrime cooperation but also matters of combating cyber-terrorism and protecting the critical infrastructure, as well as defence and national security cooperation.

**Cybersecurity laws are giving more power to law enforcement bodies.** Poland, for example, has passed a new anti-terrorism law, which gives its intelligence agency the right to 'order the blocking or demand that the electronic open source service administrator block access to information data,' and thereby allowing it to shut down online media outlets.

**Controls on exports of certain dual-use goods and technologies is being strengthened.** Dual-use technologies are those that 'may be misused for human rights violations, terrorist acts or the development of weapons of mass destruction'. The European Commission, for example, has issued a proposal for a regulation which aims to strengthen control on the export of certain dual-use goods and technologies to prevent human rights violations associated with certain cyber-surveillance technologies. The export of encryption technologies also falls within the scope of this proposal.

**Concerns with the security of critical infrastructure is increasing.** The Network and Information Security (NIS) Directive, adopted by the European Parliament, for example, defines several categories of 'operators of essential services', such as energy, transport, banking, financial market infrastructures, health, water, and digital infrastructure (including Internet exchange points, DNS providers, and top level domain name registries). They are required to take appropriate security measures and notify serious incidents to the relevant national authority.

which could suggest a low level of awareness of the need for mobile-friendly course content. The ITU should conduct a specific needs assessment study that details the bottlenecks, gaps and opportunities in developing mobile-friendly course content given the mobile readiness of the target audiences of IG courses. As suggested in this report, this may require practical, technical testing of course content to assess its m-readiness. This recommendation is also relevant to the need for innovation in learning the methodologies discussed above.

**Support civil society capacity development initiatives that seek to foster multistakeholder discussions and learning and attend to thematic gaps in mainstream IG discourse:** Civil society is a proactive stakeholder in the IG capacity development field. Our mapping has shown that it is able to form productive partnerships with governments, universities and the private sector and shows commitment to cross-sectoral learning. It is also able to build capacity on IG issues that are not mainstreamed by governments or the private sector. These include gender rights, LGBT rights, the rights of children and people with disabilities. All of this makes civil society organisations pivotal actors in IG capacity development. The ITU should strongly consider supporting civil society IG capacity building initiatives, in particular – but not only<sup>11</sup> – when they seek to create multistakeholder environments for learning and exchange, as can be seen in the IG schools.

**Create regional networks of academic supervisors in IG.** While some interviewees reported a lack of supervisor capacity at the post-graduate level in LAC and Asia, it was also suggested<sup>12</sup> that the issue was not the lack of capacity, but a difficulty in easily identifying supervisors. The ITU should consider supporting the creation of regional networks of academic supervisors capable of facilitating IG research or mentoring students who intend to pursue an IG academic path. While this would support and encourage students wishing to study IG, the networks could create productive spaces for supervisors to share issues and concerns relevant to their fields, and would allow peer-to-peer exchange on emerging IG issues and related pedagogical challenges.

**Support the introduction of IG courses at different levels of certification at universities.** IG courses offered by universities need to be available at different skill levels. Although universities are increasingly offering certification (in a non-degree or degree format) in areas that are in demand in the job market, and IG-related courses are increasingly part of the curricula of undergraduate programmes, this appears to

<sup>11</sup> Although multistakeholder interactions are important in the IG space, there remains a need for civil society to convene capacity development initiatives that attend to the specific empowerment needs of the civil society sector so as to ensure its active participation in IG fora. Although supporting these initiatives is unlikely to be within the operational mandate of the ITU, this point is made here for the record.

<sup>12</sup> By the Link Centre, University of Witwatersrand, South Africa.

be the case mostly in the United States and less so in other regions, especially developing ones. For example, a challenge in Africa – and potentially other regions too – is that the different educational and skills levels of students interested in IG or IG-related learning means that it is difficult for universities to provide a common course or curriculum at the MA-level that suits all students. It was suggested by an interviewee that beginner, intermediate and advanced courses in IG – modelling the gradation that exists in courses offered by the private sector, for example – are necessary. An exchange between universities, such as those in the United States and those in LAC, Asia and Africa, on the benefits and challenges in offering different entry points for studies in IG needs to occur. ITU could facilitate this exchange, in partnership with existing academic networks, such as the Network of Internet and Society Research Centres and GigaNet, within the context of a broader discussion of the role of universities in IG capacity development.

**The portability of credit across academic institutions and stakeholder groups should be a future goal.** With the emergence of 'modular learning', in which students can combine different certificates that may or may not count towards a degree, universities should coordinate in order to strengthen interoperability of their training programmes. Lack of interoperability and portability of credits could lead to lock-in effects: students could find it hard to make their certificates count towards achieving a degree at a different university.

**Investigate practical challenges to course certification in different countries and regions.** In spite of the existence of certification standards in some areas of IG-related capacity development, such as cybersecurity and cloud computing, our mapping has suggested that providing accredited certification for IG courses is not easily achieved, can be cumbersome, and may place an unnecessary burden on IG courses offered outside the university system. While informal certificates of completion are still offered by a significant number of capacity development initiatives, their organisers affirmed that seeking accreditation and strengthening certification is something they envision to do in the future.<sup>13</sup> ITU could facilitate a discussion on the barriers for certification and the good practices that some IG related areas may offer on this regard.

**Initiatives for harmonisation of course content are positive, but should be carried out with caution.** While some standardisation in course content may be needed, there is also a need to allow room for exploration and expression of regional and national concerns when developing IG courses. Capacity development needs in the IG sphere are fluid, with new issues of concern and technical considerations emerging. This lends some measure of instability to the capacity development needs at any given time, and some instability in creating 'standards' for course material dealing with rapidly

<sup>13</sup> 90 Interviews with Sandra Hoferichter, secretary general of EuroDIG and Niel Harper, ISOC.

diffusion'.<sup>8</sup> As it stands, a lack of clarity with regards to licensing or copyright creates a situation of legal uncertainty for all those involved in the distribution, dissemination and consumption of the training materials. In order to ensure that some materials continue to be freely shared as they have been in certain instances, authors should be encouraged to adopt alternative and legally recognised licensing systems, such as the creative commons. The ITU should also encourage the development of shared content on IG based on open licensing regimes, as well as multistakeholder discussions on practical and other bottlenecks to knowledge diffusion in the IG space.

**Clearer commitments with gender balance should be made by capacity development organisers, particularly by those that have a selection process for participants.** Although SDG 5 aims at achieving gender equality and empowering all women and girls, ITU's ICT Fact and Figures 2016 suggest that the global Internet user gender gap grew from 11% in 2013 to 12% in 2016. Capacity development could play an important role in fostering gender inclusion in the Internet sector. Calls for applications for participation in IG courses such as those run by IG schools should specify that the selection process will take into account gender diversity. This does not only encourage women to apply, but also helps to reinforce good practices. In case selection processes are not in place, efforts to achieve a greater gender balance should be included in the advertisement of the courses. The ITU should encourage a gender perspective on IG capacity development generally. The ITU should consider aligning itself with gender-rights bodies, including UN Women, or organisations that deal with gender and Internet issues such as the APC's Women's Rights Programme. This engagement should be developed in tandem with a concern for children's rights online.

**Support the development of online multilingual content for IG capacity development.** Multilingualism needs to be strengthened in IG capacity development. With some exceptions,<sup>9</sup> English is the predominant language both in face-to-face and in online trainings offered by all stakeholder groups. The general lack of courses available in diverse languages strengthens the marginalisation of individuals and groups not proficient in English and excludes them from the IG discourse and processes. The ITU should consider supporting the translation of shared, baseline course material, including content that is currently available online. Online asynchronous courses – which convey the content through texts, slides, or pre-recorded videos, for example – seem to

be more apt to be translated into different languages, if compared with face-to-face capacity development initiatives.

**There is need for further adaptation of capacity development initiatives to regional needs.** Capacity development should be, to the extent possible, demand-driven and in sync with regional priorities. This includes not only adjusting the content of the courses but also providing an enhanced capacity development to developing regions – which includes, for example, career placement and mentoring of innovative ideas. Microsoft 4Africa Initiative provides a good example. Similar initiatives should be present in other developing regions, such as Latin America. Multistakeholder partnerships are important for identifying regional needs and target groups.

**Encourage innovation in IG capacity development methodologies.** Different ways of building capacity, and fostering engagement, especially from groups marginalised in IG processes, need to be explored. Not all IG capacity development needs to be conducted through courses or workshops. For example, in spite of the fact that ICTs facilitate the provision of educational content in new, better and more effective ways, a significant number of the capacity development initiatives mapped here make little use of the newest advancement of technologies. While a simple remedy for this is to make texts, slides or videos available online, IG capacity can be developed in innovative, interactive and entertaining ways that do not necessarily follow the standard methodology of seminars. The ITU should support innovation in online learning methodologies in the IG space. In this regard, there is a potential to commission a study that maps innovation in online learning methodologies across different sectors and fields that may prove useful in building development in IG amongst different stakeholders.<sup>10</sup>

**In online capacity development, facilitators or tutors are still important.** They seem to be particularly present in advanced courses and courses that propose practical exercises to participants. Introductory or foundational courses do not always have facilitators, especially if they are made available online to be taken in a self-paced manner. In all cases, according to interviews, the assistance and encouragement of course facilitators tend to mitigate drop-out rates. ITU could partner with other international organisations, such as and W3C, to develop a toolkit with key factors of success when it comes to online capacity development, including technical issues such as accessibility of the online learning environment and human resources, such as facilitation and tutoring. At the same time, the skills level of facilitators in capacity building initiatives needs to be assessed.

**Online learning platforms need to be compatible with the mobile environment.** Capacity development organisers rarely provide information about mobile adequacy,

<sup>10</sup> For example, online language tutorials have shown some creativity in the application of the Internet in learning new languages.

**The adoption of encryption by online platforms and the use of HTTPS is increasing.** According to Google: 97% of connections to Youtube are encrypted. Netflix moved towards using HTTPS to encrypt the transport of the video content it streams, in order to keep customer information, search queries, and other confidential data safe. Facebook introduced opt-in end-to-end encryption for Messenger chats. End-to-end encryption was also introduced in WhatsApp. At the same time, laws requiring encryption backdoors on messenger apps are being proposed in several countries.

**Extremist and criminal groups are using encrypted messaging and the dark web.** As a response, some governments – such as the German and French ministers of interior – are calling for a decryption legislation that would allow intelligence and law enforcement agencies to access encrypted data. The Apple/FBI case is emblematic of an ongoing discussion on whether – and to what extent – courts can compel manufacturers to assist in providing access to cryptographically protected data on their products, such as cell phones.

**Stakeholders are increasingly collaborating on child safety measures.** The private industry is developing new measures to identify illegal online child abuse content and identify the victims and perpetrators more quickly, such as the use of hashing technology. Stronger collaboration among governments, LEAs, the industry, educators, and civil society – on both national and international levels – is leading to improved efforts to minimise the online risks for children. At the same time, there is a stronger focus on a rights-based approach which aims at keeping children safe online while safeguarding their rights in the digital environment.

### 3. Human Rights

The understanding that the same rights that people have offline must also be protected online is the underlying principle for the discussion of human rights on the Internet. Human rights issues should also be understood as cross-cutting and interdependent. For example, the right to freedom of expression and information is related to access to the Internet and net neutrality, while ensuring the protection of privacy is important in dealing with cybersecurity. The following trends can be identified in the field of human rights:

**International soft law is further defining states' obligations when it comes to the protection of the right to privacy online.** A UN resolution adopted in December 2016, for example, invites states to refrain from requiring companies to take steps that interfere with the right to privacy in an arbitrary and unlawful way, while specifically calling for informing users about company policies that may impact their right to privacy.

**The adoption of national laws that expand investigative powers and data retention and that weaken encryption has**

**been augmenting.** Some of these measures have been considered disproportionate by the UN Special Rapporteur on the right to privacy in a report issued in 2016. In many cases, they have also been criticised by human rights activists and the private industry.

**International courts decisions' play an important role in establishing limits to national policies on personal data collection.** The Court of Justice of the European Union (CJEU), for example, may pose a challenge to the UK's Investigatory Powers Act, related to the bulk collection of communications data and set a new precedent for EU member states' data retention regimes, stating that 'general and indiscriminate retention' of data is prohibited.

**Human Rights are affected by private networks and platforms that are created, maintained, and operated by ICT sector companies and organisations.** Several research initiatives, as well as a report published by the UN special Rapporteur on Freedom of Expression, have pointed out human rights violations, which frequently stem from companies' terms of services.

**Internet disruptions are on the rise, often for reasons related to security and the protection of local businesses.** Studies estimate that the negative impact of these measures on economic growth account for USD 2.4 billion per year. The UN Human Rights Council has passed a draft resolution that condemns the intentional disruption of citizens' Internet access.

### 4. Legal issues

The legal basket includes six issues traditionally associated with the legal aspects of digital policy: copyright, trademark, jurisdiction, arbitration, Internet intermediaries, and labour law. A cross-cutting challenge, common to all topics included in the legal basket, is the application of existing legal mechanisms to Internet transactions, particularly in view of the transborder nature and speed of Internet activities. The following trends can be identified when it comes to legal issues:

**Conflicts involving jurisdiction will become increasingly important.** The transborder nature of the Internet has posed considerable challenges to the territorially based concept of national jurisdictions. There is a mismatch between the global Internet infrastructure, which naturally transcends borders, and the plurality of legal approaches that countries adopt with regard to issues such as content removal and access to personal data. Conflicts of jurisdiction could lead to the fragmentation of the Internet, as recognised by a 2016 report commissioned by the World Economic Forum.

**The limits of intermediary liability are still being defined, especially when it comes to the protection of intellectual**

<sup>8</sup> See, for instance, Finlay, A. and Brown, D. (2016) Key considerations: Economic, social and cultural rights and the Internet. In Global Information Society Watch (2016). The APC, Montevideo. <http://www.giswatch.org/en/economic-social-and-cultural-rights-esrcs/key-considerations-economic-social-and-cultural-rights->

<sup>9</sup> For example, as outlined earlier in this report, some of ISOC's courses are translated into Spanish and two are translated into French. Some W3C online courses are translated to Spanish, Japanese, Korean and Portuguese. The WIPO Academy and ITU Academy also place emphasis on multilingualism in capacity development.

**property rights.** Operators of websites linking to materials that infringe copyright can be found guilty of copyright infringement, if the operators knew or could reasonably have known that the material was illegally distributed, according a CJEU ruling.

**Social media platforms may be included within the framework of media companies.** The role that social media plays in content distribution has been long emphasised. The attention given to the spread of fake news during the United States presidential campaign stirred up the debate. In response, Google and Facebook have announced to be working on changes to prevent 'fake news' websites to use their respective advertising networks. The Cyberspace Administration of China has announced in a statement that media will no longer be able to report news obtained from social media sites without approval.

**Alternative models for collecting the revenues of authors for online distribution of their work are under discussion.** Copyright reform proposals that address this issue, put forth by the European Commission, have raised concerns among Internet companies, like Google and Mozilla.

**The rulings and guidelines are increasingly shaping the sharing economy, including labour law aspects.** Court decisions have ruled that Uber drivers, for example, were employees of the company rather than independent contractors. The European Union has issued new guidelines on the sharing economy, which include labour-related issues.

## 5. Economic issues

Online economic activities have been among the main engines of Internet growth, and contribute to overall economic and social development. The economic basket includes a wide range of policy issues including: e-commerce, virtual currencies, consumer protection and taxation. Capacity development on economic issues is necessary for all stakeholders in order to foster online businesses, improve legal frameworks and enhance consumer trust. The following trends can be identified when it comes to economic issues:

**E-commerce is being considered a key element to foster development and economic growth.** The digital revolution is expected to play an important role in fostering economic growth in the coming years.

Among the new business models enabled by ICTs, e-commerce has been considered key to fostering development. Business-to-business e-commerce is valued at over USD 19 trillion and business-to-consumer already accounts for over USD 2 trillion. If small companies in developing regions are connected to the Internet, they can enjoy access to the global market, fostering inclusion and development. Initiatives to boost e-commerce in developing countries are being

launched, such as the eTrade for All initiative, put forth by UNCTAD.

**Traditional IG policy issues are being included in the multilateral trade agenda.** An exchange of views among WTO member countries mapped the trade-related aspects of e-commerce that would fall under the remit of the WTO, and included issues such as: network neutrality, data localisation, interoperability and encryption. Capacity development on trade policy and digital policy will be necessary to help actors participate in the discussions at the multilateral level.

**Free flow of data is key to the sustainability of trade and of a large number of ICT companies.** The Transatlantic flow of data is governed by a new framework – the EU-US Privacy Shield – which has replaced the Safe Harbour Agreement invalidated by a CJEU ruling.

**Adjustments are being proposed to taxation policies aimed at their application to e-commerce transactions.** This includes, in some cases, the sale of online content. New rules for the value added tax (VAT) are being discussed in the European Union, India and China, for example.

**Virtual currencies are starting to be introduced in monetary systems.** Tunisia and Senegal have adopted virtual currencies. In the latter case, there are plans to expand the use of the currency to the central African region. Blockchain technology is in the base of this development, increasing security and reliability of the virtual currency system. In parallel, there is a recognition that digital currencies pose a money laundering and terrorism financing threat. Europol, Interpol, and the Basel Institute on Governance have formalised the establishment of a tripartite partnership for a working group on money laundering with digital currencies.

**The importance of e-finance and e-banking is expected to grow.** E-finance includes investing, banking, mortgage lending, and it is a reflection of the spectacular growth of the Internet. One example is FinTechs. These technology startups will play a key role in mobile payments, money transfers, loans, fundraising and asset management. When it comes to e-banking, although many traditional brick-and-mortar banks offer online accounts, there are also web-only banks, such as NetBank. Besides convenience, these banks offer superior rates and lower fees.

## 6. Development issues

The development basket includes the following public policy issues: the digital divide, access, and capacity development. Development issues are cross-cutting affecting all other baskets, ranging from the telecommunications infrastructure in developing countries, through capacity building for cybersecurity protection, to questions related to broadening

impact on human rights should be included in these consultations.<sup>4</sup> Some existing resources (such as the IETF tutorial on standards and privacy) could be leveraged and support the development of courses, while organisations and institutions already working in the field of human rights and technology can be approached for baseline course content.

**Encourage capacity development initiatives to tackle public interest or developmental aspects of the topics they cover.** The capacity development initiatives sampled on this research offer considerably less opportunities to reflect on the use of technology on the public sector and for achieving societal goals and the public good. Socio-cultural issues and development issues, such as the digital divide and the use of Internet-related technology advancements to foster development, remain less covered. These subjects could be further reinforced in the curriculum of existing courses or offered as a non-degree certificate course in universities. The course on ICTs and development offered by UC Berkeley offers a good example of how to foster specialisation on development issues. The links between universities and the public sector need to be strengthened, mirroring the efforts that universities are making to understand the issues and skills that seem to be valued by the private sector and the job market. The ITU offers a good platform to reflect on the use of technology to foster the public interest. It has convened, for example, a discussion of the use of the IoTs for the social good.<sup>5</sup>

**Support courses that present technical aspects in an easy manner to decision-makers, showing the interplay between technical and policy options.** An example of how this could be done is the course on IPv6 provided by AFRINIC, in which one of the modules is targeted at decision makers and company managers, in order to explain the importance and possible strategies for IPv6 deployment. The courses provided by GSMA to policy makers, which present and pros and cons of adopting policies in a wide range of fields, from mobile taxation to child protection offer another good example. Activities of immersion, such as IETF and ISOC's fellowships granted to policy makers to attend IETF meetings, should also be further supported. However, these technical discussions also need to occur within the context of a rights-based approach to development to avoid a techno-centric approach to IG capacity building.

**Promote discussion on how to strengthen a multidisciplinary approach to capacity development in IG across stakeholder groups.** Multidisciplinary is a characteristic of the capacity development on IG offered by the academic sector. The breaking of silos between different areas of knowledge can be noticed on the curricula of university courses: traditional professionals in the human sciences

field, such as journalists, for example, will increasingly display skills in areas like big data analytics and programming. Multidisciplinary is often less present in the capacity development offered by other stakeholder groups. This is natural, to the extent that universities present the ideal conditions to bring together different areas of knowledge. The research centres that work with Internet-related issues are usually created by means of an association among university departments (the most common partners are departments in communication, computer science, engineering, public policy and international aspects). Organisations in other sectors have less access to a pool of diverse knowledge – which only a University environment is able to provide – and usually tend to specialise of their field of expertise. Nevertheless, there are partnerships, good practices methodological approaches that can facilitate a multidisciplinary view in IG training. The ITU could contribute by offering multidisciplinary courses and could promote a discussion on how to enhance a multidisciplinary approach in IG capacity development.

**Support the development of open content IG curricula where possible, as well as the productive reuse of this content for non-profit purposes.** As pointed out in this report, in most of the capacity development initiatives, there is no clear regime of licensing being applied to course materials and little information with regards to the possibility of sharing the materials was available. Course content that is copyrighted and unavailable for reuse has the potential to inhibit innovation and shared-learning in the IG sphere. It has the potential to create pockets of exclusive knowledge and know-how, and exaggerate imbalances in participation in IG decision-making forums that already exist. At the same time, even within institutions that support IG capacity development, such as ICANN, the absence of shared content is reported to place a strain on organisational resources and employees who seek to build capacity in the field.<sup>6</sup> Further, difficult questions are being raised by those who support IG capacity development financially or otherwise, but find that the initiatives they support do not openly share their course content.<sup>7</sup> While courses such as those offered by universities which charge for learning may require some level of exclusivity in their course content, it is our view that much of this could be openly accessible, such as reading lists, journal articles or other select learning resources, particularly in light of the need to develop a common discursive space on IG. As has been noted elsewhere, an open content approach is in line with the recent decision by the European Union on the provision of free public access to publicly funded scientific papers, as well as the position of the former Special Rapporteur on cultural rights who proposed the 'adoption of a public good approach to knowledge innovation and

<sup>4</sup> Article 19, APC and others such as the Central European University specifically stand out.

<sup>5</sup> <http://telecomworld.itu.int/blog/using-the-internet-of-things-for-social-good/>

<sup>6</sup> This point was made in informal discussions at the 2016 Internet Governance Forum.

<sup>7</sup> *ibid.*

# Chapter 4:

## Recommendations

A large number of individuals have been trained in IG and digital policy. The shift towards a more mature phase would require a stronger focus on organisational development, by ensuring sustained participation in policy processes. This includes developing the organisational capacities of governments, civil society, business associations, and academia in developing countries.

The following recommendations should be read in conjunction with Chapter 3, which identifies gaps in IG capacity development. This chapter presents some general conclusions and recommendations as well as aims to offer suggestions for ITU's interventions in the field of IG capacity development in order to better address the needs of its membership.

**Ensure comprehensive capacity development which will make a sustainable impact on organisations, networks and wider society.** It is important to skill individuals. However, capacity development programmes should be based on a broader strategy and be designed and planned with the aim of providing more than training. In particular, acquired individual competencies should help building institutional and national capacities (e.g. support ministries involved in IG, strengthen NGOs, local businesses, etc.). Discussion on required competencies should be fostered on a national level in a multistakeholder manner via national IGFs, for example, and/or IG-related policy discussions. The ITU could engage ministries, NGOs, academia and business in helping to shape a training curriculum that addresses the needs of these actors.

**Encourage a rights-based approach to capacity development when considering the use of technology and infrastructure for developmental purposes.** Notably absent from many of the courses mapped here is a consideration of ICT-for-development from a rights perspective. Although technological innovation and the rapid expansion of access to many underserved communities has shifted the emphasis away from development discourse, the application of ICTs for development in sectors such as education and health, and in terms of primary access to technology and the Internet, remains a concern for many regions in the world. Long-standing development concerns such as access, cost, appropriate technology, and skills development need to be considered more thoroughly in a number of capacity development interventions mapped here, in particular from a rights perspective. This would bring the courses more fruitfully in line with the current Sustainable Development Goals.

In this regard, the ITU should support the development of course content that discusses IG in the light of basic developmental concerns such as access, skills, literacy and the marginalisation of women, amongst them, within a human rights framework. Some potential partners for this activity have been identified on the tables included in the previous chapter. At the same time, it feels appropriate for multi-stakeholder discussions that deliberate on the importance of the SDGs for IG generally to be convened, and the appropriateness of ICT-for-development discourse and concerns in the context of the rapidly evolving technological field outlined at the start of this report.

**Support the development of course content that spells out the link between infrastructure issues and human rights, and encourages those offering techno-centric course content to include human rights considerations.** Some authors have pointed to a reluctance amongst technical institutions to consider human rights as a primary concern.<sup>1</sup> However, issues that were considered purely technical, such as the allocation of new top-level domains (TLDs) in an institution like ICANN, have shed light on how apparently 'technical decisions' have an impact on economic, social and cultural rights as well as civil and political rights.<sup>2</sup> With some exceptions,<sup>3</sup> the separation between technical concerns and the human rights framework is seen in a number of the capacity development initiatives mapped here. Capacity development dedicated to standards, Internet protocol and domain names, for example, often seem not to take into account the interplay of these issues with human rights. There is therefore a need for internet technical organisations immersed in IG capacity development, as well as institutions offering a techno-centric curricula, to more strongly consider ethics and human rights in their governance curriculums as a way to at least explore how technical decisions impact human rights at the global, regional and local levels. In this regard, the ITU should support discussions between the technical community, universities and civil society on how this can be done, as well as the development of appropriate learning content. Institutions and organisations actively working on the interplay between technical considerations and their

<sup>1</sup> For a discussion on this, please see: Doria, A (2015) How the technical community frames the Internet and economic, social and cultural rights. APC, Montevideo.

<sup>2</sup> See, for instance, Jaramillo Gajardo, P. et al (2015) The Internet domain name system and the right to culture. APC, Montevideo.

<sup>3</sup> For instance, as pointed out ISOC deals with the right to privacy in its courses. Civil society capacity building initiatives tend to emphasise the impact of technology and infrastructure on rights, with similar considerations found amongst select university courses.

access to the Internet in the developing world. The following trends can be identified among development issues:

**Alternative platforms and technologies to provide access to the Internet in developing areas will proliferate.** Facebook, for example, is launching satellites that will enable the project Internet.org. It has also launched solar-powered drones that provide connectivity and OpenCellular, a device that allows users to set up their own local wireless networks. AT&T revealed plans to deliver low-cost, high-speed Internet access using power lines.

**The digital revolution is expected to play a key role in fostering economic growth and development in the coming years.** This has been recognised, for example, by the G20 Communiqué from the 2016 Hangzhou Summit. Affordable and universal access to ICTs and broadband connectivity has been also pointed out as a precondition for achieving the Sustainable Development Goals.

**Waves of migration and refugees will increase the pressure for affordable access.** According to from the UN Refugee Agency (UNHCR), access to a mobile phone and the Internet is critical for the safety and security of refugees and essential for keeping in touch with loved ones. Refugees living in urban areas tend to have similar access to mobile networks as other urban populations, but in rural areas only one in six refugees have access to connectivity.

### 7. Socio-cultural issues

The socio-cultural basket includes policy issues triggered by the broad impact of the Internet on the social and cultural life of modern society. This basket covers a wide range of topics, such as content issues, promotion of cultural diversity and multilingualism. The following trends can be identified among socio-cultural issues:

**Pressure to counter terrorism and radicalisation online will increase.** Internet companies Facebook, Microsoft, Twitter, and YouTube have announced the creation of a common database to identify potential terrorist content, and curb its dissemination on multiple platforms, removing content when appropriate. This happens in parallel to lawsuits filed proposed by the families of the Orlando and Paris attacks victims, among other cases, suing Google, Twitter, and Facebook for contributing to radicalisation. Governments are also expressing concerns: the UK Home Secretary admitted that extremist material is spreading online at such a fast rate that UK security services are unable to keep up, while Denmark has announced a list of measures against growing radicalisation.

**The right to be forgotten is being introduced in more countries; the delicate balance between the right to privacy and the right to freedom of expression is under focus.** More

countries have introduced the right to be delisted, although the actual content of laws proposed may vary. A recent law approved in Indonesia, for instance, covers not only search results, but also requests web administrators to remove the actual content. The latest request by the French data protection regulator for Google to apply its delisting across search results globally, drew criticism over the impact on freedom of expression.

**Filter bubbles and the lack of transparency over algorithms will be a growing concern.** German chancellor Angela Merkel argued that Internet users have a right to know on what basis they receive information through search engines. The lack of transparency over social engine algorithms may 'lead to a distortion of our perception' and 'shrink our expanse of information'.

**Barriers to content availability and distribution are among the issues that play an important role on slowing the pace of Internet adoption in developing regions.** In Africa, for example, the importance of fostering locally created content, available in familiar languages (which are often different from the official national language), has been emphasised by recent researches. Fostering the diversity of content has always been an issue on the Internet governance agenda. Capacity development is necessary to empower individuals, so they become not only consumers, but also producers of online content.

### Conclusion

IG is a highly dynamic field, which is undergoing significant changes. Some of them are prompted by the exponential increase in the power of computing and the arrival of a new wave of technological innovation. Big data and the Internet of Things will cause ripples in many policy areas, from security to legal and economic issues.

The second cause of change is the natural expansion and the increasingly complex nature of human activities online. The digital sphere is where most of the speech, interaction and commerce flourishes. The same kind of policy problems that existed offline – from hate speech, to radicalisation; from copyright to the challenges of taxation – need to be faced online. However, these challenges also present new characteristics, such as the viral scale with which they spread and the fact that these public policy issues so easily cut across jurisdictions.

This scenario of transformation takes place in parallel to a process of active digital policy-making. States are enacting national laws and reshaping the agenda of international institutions to deal with Internet related topics. Likewise, International Courts are increasingly called upon to adjudicate and solve emerging tensions. As a consequence, diplomacy and international law will be increasingly important in the years to come.

There is need for capacity development initiatives that are holistic enough to introduce actors to the trends comprised in each of the IG baskets, preparing them for the challenges they will be confronted with in everyday Internet use, and giving them the necessary information to constructively take part in the governance processes that shape the digital policy agenda. At the same time, it is also necessary

to provide a specialised kind of capacity development that will dive deep into specific issues, helping students acquire the knowledge and skills necessary to be fully integrated in the job market, in policy-making processes and in the production of original thought in the IG area. The mapping developed in chapter two sheds some light on the supply of capacity development in the global IG field.

The second category of capacity development initiatives is oriented towards developing specific skills that can be applied to the job market. These courses frequently present a specific target audience, such as individuals that possess a certain skillset, such as knowledge on standards and programming, or that want to develop certain aspects of their career.

offered by technology to provide courses that are flexible, self-paced and that cater to individuals that need to reconcile their professional activities with lifelong learning.

In spite of that, this research identified relevant gaps, such as:

Taking this scenario into account, some key gaps identified in terms of target audience are related to:

- Providing high quality and up-to-date capacity development at different levels (introductory, intermediary, advanced) to cater to different audiences (for example, beginners, policymakers, law professionals);
- Providing capacity development to policymakers, legislators, members of law enforcement bodies;
- Providing capacity development for SMEs on the digital transformation and on the opportunities created by technology;
- Providing capacity development to marginalised communities – including people with disabilities, as well as indigenous communities, poor people, and those who do not speak dominant languages.
- Programs that financially assist workers in choosing and paying for online courses that would enable their re-skilling were not identified. These support could be important in a context of automation.

- A lack of a clear definition of what constitutes capacity development, more generally, or a course, more specifically, on Internet governance. The word ‘course’, for example, is equally used to refer to weekly 60-minute lectures offered on a regular basis, in which students are expected to go through certain material, such as texts and slides, and to initiatives that require a determinate number of weeks of engagement with a significant weekly workload.
- A narrow understanding of capacity development – mostly seen as skilling individuals. A set of goals should be defined for capacity development initiatives, showing how they bring a sustainable impact on organisations, networks and wider society.
- A lack of clarity with regards to the update of course materials. Most of the capacity development initiatives do not mention the frequency with which their content is reviewed and updated. In a fast-paced and dynamic field such as Internet governance, constant update is crucial to assure the quality of the content and the reliability of the information.
- An insufficient multilingual approach to capacity development. With some exceptions, English is the predominant language both in face-to-face and in online trainings offered by all stakeholder groups.

### Gaps in delivery methods and methodological aspects

The sample of capacity development initiatives encompassed in this research covers a broad range of delivery methods – face to face, online and hybrid ones. Providers of capacity development are taking advantage of the benefits

Table 13: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to development issues

Development issues	Organisations that cover issues	Policy Trends	Gaps
Access	ISOC Link Centre, University of Witwatersrand APC GSMA Microsoft USTTI CTO ITU AfrSIG APSIG	Alternative platforms and technologies to provide access to the Internet in developing areas will proliferate	The focus is placed on traditional technologies and actors, not on emerging ones.
Other development-related issues	UC Berkeley Universidad de San Andrés University of Cape Town APC DiploFoundation MEAC-SIG EuroSIG	The digital revolution is expected to play a key role in fostering economic growth and development in the coming years	How the digital revolution can help to create growth and jobs in the particular circumstances of developed and developing countries
	TaC	Waves of migration and refugees will increase the pressure for affordable access	Internet and migration is a scantily covered topic.

# Chapter 2: Review of IG capacity development

Table 12: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to socio-cultural issues

Socio-cultural issues	Organisations that cover issues	Policy Trends	Gaps
Content policy	AfriSIG APSIG Central European University MIT - Center for Civic Media American University APC DiploFoundation	Pressure to counter terrorism and radicalisation online will increase	Interplay with freedom of expression, responsibility of intermediaries.
		The right to be forgotten is being introduced in more countries; the delicate balance between the right to privacy and the right to freedom of expression is under focus	
		Filter bubbles and the lack of transparency over algorithms will be a growing concern	Insufficiently covered topic, especially when it comes to the consequences to freedom of information and democracy
Cultural diversity	MEAC-SIG APSIG ISOC Link Centre, University of Witwatersrand APC DiploFoundation	Barriers to content availability and distribution seem to play an important role on slowing the pace of Internet adoption in developing regions	Cultural diversity is a scantily covered topic.

### Summary of content gaps (Table 12):

- The availability of online content, and its impact on the socio-cultural well-being of individuals and groups needs attention in IG capacity development initiatives overall. This includes re-invigorating discussions on content policy, cultural diversity and multilingualism
- The shifting role of the media, and the impact of media in general on the rights of groups and individuals needs to focus more attention on IG capacity development initiatives
- The impact of the use of technologies such as algorithms on socio-cultural rights needs more widespread attention in IG capacity development initiatives

### Development issues

Most of the capacity development initiatives do not touch upon the three themes encompassed in this basket (Access, Digital Divide and Capacity Development). In some respects this may represent a shift in the terminology of the sector, with concepts such as 'digital divide' being less frequently used in the current conceptualisation of the role of the Internet. Course content dealing with access and digital divide issues is insufficient, and this is a significant gap in the IG training curricula.

Capacity development initiatives are mostly focused on other types of development-related issues, such as the impact of technology on democracy and strengthening citizen's participation. This seems to be in tune with some of the key policy trends in chapter 1. There is interest in development issues across the stakeholder groups mapped. E-government, telemedicine and e-learning are also present, but only in a few of the initiatives mapped in the report. There is little consideration for fostering digital literacy.

Insufficient deliberation is given to the use of emerging technologies, such as big data and the IoTs for achieving the objectives of public policy and in the public interest.

### Summary of content gaps (Table 13):

- Access to the Internet in the context of development generally, but specifically focusing on: the inclusion of marginalised groups and the poor; the prohibitive costing that further marginalises vulnerable people; the negative impact of the digital divide on development and rights; the need for skills and capacity development.
- Appropriate digital literacy to strengthen citizen participation, the participation of migrant and displaced communities in governance structures, and to strengthen democracy generally.
- Appropriate access to strengthen service delivery to citizens and migrants and displaced communities through e-government, e-health, e-education amongst them.
- Emerging technologies for the social good.

### Gaps with regards to the target audience

As previously discussed in chapter 2, capacity development in IG can be grouped into two categories. The first consists of courses that provide a general overview and aim to provide the necessary knowledge for individuals to participate in the discussion and development of Internet-related policies, or to engage in the conscious self-governance of their digital lives. Most of the capacity development initiatives that belong to the first group do not have a specific target audience; they are open to any interested party that wants to engage in the learning process. Due to the absence of barriers of entry, these courses could be an interesting starting point for newcomers to the Internet governance debate.

This chapter includes the findings of an analysis conducted on a sample of capacity development initiatives offered by five of the key stakeholder groups<sup>1</sup>: the Internet technical community, the academic sector, civil society, the private sector, and international organisations. For the purpose of this research, only initiatives that present a global or regional scope were taken into account. Capacity development offered by national governments, therefore, has not been included. In spite of that, it is important to emphasise the key role governments play in creating enabling conditions for capacity development initiatives. Moreover, throughout the report, there are examples of initiatives in which two or more stakeholders get together – including in the format of public-private partnerships – and provide resources for the initiative to flourish.

An additional section, with comments, on the Schools of Internet Governance (SIGs) has been added to this chapter. SIGs are increasingly important in the capacity development landscape, functioning as an entry point for newcomers, and broadening the knowledge of actors who have been professionally focused on specific IG areas.

Capacity development in IG can be grouped into two categories, which cut across stakeholder groups. The first aims to provide the necessary knowledge for individuals to participate in the discussion and development of Internet-related policies, or to engage in the conscious self-governance of their digital lives. This is the case with courses that provide a general overview of many thematic areas, for example, and courses that explain how to protect one's privacy or security online. The second is oriented towards developing specific skills that can be applied to the job market. Although the first category could bring about indirect professional benefits, the second clearly aims to provide a professional competitive advantage. The two categories can benefit policymakers and regulators, depending on previous knowledge of Internet governance issues and professional focus.

Both types of capacity development are necessary. There is a need to prepare professionals for the technological jobs of today and emerging jobs of tomorrow. At the same time, there is a need to teach individuals how to operate in the

digital world, to make informed decisions, and to contribute to the development of accountable, efficient, and sustainable governance mechanisms.

## The Internet technical community

### General overview

The Internet technical community is remarkably involved in capacity development, both as providers of courses, and sponsors of capacity development initiatives provided by other stakeholder groups. This section focuses on assessing the role of Internet technical organisations as providers of capacity development. The sample selected for the study encompasses the organisations known as the I\* (read 'I star'), which is a group of actors responsible for the coordination of the Internet's technical infrastructure.<sup>2</sup> Most of them currently provide some modality of capacity development.<sup>3</sup>

The capacity development provided by the Internet technical community could be grouped into three broad categories: 1. online courses; 2. in-person trainings; 3. other types of capacity development initiatives.

### Online courses:

Organisations from the technical community have taken great advantage of online opportunities to increase the outreach of their capacity building efforts. The majority of them conduct at least part of their capacity development online through an e-learning platform, where they host a catalogue of courses. This is the case with ISOC's Inforum, ICANN's Learn, W3C's W3Dev Campus, RIPE NCC's Academy, and LACNIC's Campus Online.

<sup>2</sup> The I\* includes the following organisations: the Internet Corporation for Assigned Names and Numbers (ICANN), the Internet Engineering Task Force (IETF), the Internet Architecture Board (IAB), the World Wide Web Consortium (W3C), the Internet Society (ISOC), and the five regional Internet address registries. These registries are: African Network Information Center (AFRINIC), American Registry for Internet Numbers (ARIN), Asia-Pacific Network Information Centre (APNIC), Latin America and Caribbean Internet Addresses Registry (LACNIC), and Réseaux IP Européens Network Coordination Centre (RIPE-NCC).

<sup>3</sup> ARIN provides a list of links and documents for general education that constitute a useful library but that did not fall under the scope of capacity development for the purpose of this research.

<sup>1</sup> The key IG stakeholders have been identified in the Tunis Agenda, one of the outcome documents of the World Summit on the Information Society (2005).

The **technical requirements** to access the e-learning platforms are not always specified. Most of them seem to be compatible with basic computer settings and low bandwidth. Some notable exceptions are APNIC's e-Learning, which is methodologically based on participants' interaction using audio and video and requires broadband connection,<sup>4</sup> and W3C courses, which have specific requirements related to the subject of the course, such as basic image editing software or a text editor for HTML, CSS, and Javascript. Overall, the adequacy of the platforms to the mobile environment is rarely mentioned. Practical testing would need to be carried out to find out this information.

The courses are offered **in English**, with the exception of the courses developed by LACNIC, which are originally in Spanish. Some organisations are making efforts to translate an increasing number of course materials into other languages. Out of the seven courses offered by ISOC's Inforum, for example, five have been translated into Spanish and two into French. Some of W3C's online courses have been translated into Spanish, Japanese, Korean, and Portuguese.

ICANN's online platform offers a combination of courses designed by ICANN and those designed by third parties, such as academic professionals and NGOs. The platform is open to any actors interested in teaching a course; however, ICANN exercises quality control over the content.

In most of the capacity development initiatives, **there is no clear regime of licensing being applied** to course materials and no information on the possibility of sharing course materials. An exception are W3C's W3Dev Campus courses. The platform states that all material, including that produced by participants in assignments and correspondence, is copyrighted and cannot be copied, duplicated, posted on another website, or otherwise used without the original author's consent.

Most online capacity development initiatives are open to all interested stakeholders. In some cases they are available on a members-only basis. For example, interested participants need to become members of ISOC before they are able to take courses on Inforum. Some other course organisers define the profile of the target audience of each particular course, such as previous knowledge on the topics that will be tackled (IP, DNS operations or web standards, for example).

In terms of a **methodological approach**, most of the courses are self-paced, which means that students can choose a time at their convenience to access the platform and resources. A few training initiatives require participants to connect to the platform at a specific moment, to follow lectures in real-time, such as APNIC eLearning and LACNIC webinars.

All course materials – consisting of slides, videos or text, for example – are made available to the participant after registration. They are studied individually, usually without the active support of a tutor or facilitator (some courses provide the option to contact a course administrator in case of need). Some examples are ISOC's Inforum, ICANN Learn, RIPE NCC Academy and LACNIC campus online. The RIPE NCC Academy is a hybrid model in which students study individually at their own pace, but are given a certain amount of time to complete the course and need to pass assignments consisting of multiple-choice questions to be granted a certificate of achievement.

Some of the self-paced courses may also be offered to a particular group or class. ISOC's Inforum course 'Shaping the Internet: History and Futures', for instance, is offered to a group of young ISOC ambassadors in preparation for the Internet Governance Forum (IGF), with the assistance of a facilitator. LACNIC campus online offers the advanced course on IPv6 to groups which count on the assistance of a facilitator. LACNIC's introductory course to IPv6, however, is offered as a self-paced, non-facilitated course.

Some self-paced courses establish milestones of completion, such as weekly modules. These milestones seem to be particularly effective when the course is provided to a group of participants who interact and move forward together through the course materials, usually with the assistance of a course facilitator, such as W3C's W3Dev Campus. Interaction among participants seems to be enabled by class forums and, sometimes, weekly meetings.

There seems to be very little harmonisation with regards to the duration and workload of online capacity development provided by the Internet technical community. The word 'course' is equally used to refer to weekly 60-minute lectures offered on a regular basis, in which students are expected to go through certain material, such as texts and slides, and to initiatives that require a determinate number of weeks of engagement with a significant weekly workload.

The existence of a certificate upon completion seems to be a better criteria to differentiate the courses. **There seems to be no certificate if the amount of engagement has not been pre-defined or is very low.** The online courses that clearly mention the provision of a certificate are usually those that require the completion of assignments in order to test the understanding of the course content. This is the case, for example, of the RIPE NCC Academy, W3C's W3Dev Campus and W3C paid MOOC courses (these can be taken free of charge if the student does not wish to obtain the certificate). Participants do not need to pay for most of the online capacity development offered by the Internet technical community, with the exception of W3C's W3Dev Campus courses and W3C's certified MOOC courses.

<sup>4</sup> APNIC recommends the use of an updated web browser with Adobe Flash Player 11 or above, a Broadband connection running at a minimum of 256kbps or better, and a headset (to reduce noise).

## Economic issues

As discussed in this report, key emerging economic issues, include the importance of e-commerce for development and economic growth, taxation and e-commerce, e-finance and e-banking and virtual currencies.

Compared to the other stakeholder groups, the academic sector seems to be the one to put the most emphasis on economic issues among the IG capacity development initiatives mapped here. While most of the initiatives cover economic issues in a very broad and generic manner, such as addressing the changes brought forth by the digital economy, other initiatives tackle very specific points such as costing and pricing, e-payments and e-marketing.

There is little interest in consumer rights in the IG capacity development discourse. Only four of the capacity development initiatives mapped deal with consumer protection. Most notable is the lack of discussion on consumer rights in IG Schools. Civil society initiatives show considerably less coverage of economic issues.

### Summary of content gaps (Table 11):

- There is a strong need to address issues of consumer protection and rights in the e-commerce sphere and within the context of IG
- Course on emerging issues such as virtual currencies and their impact on IG need to be strengthened
- Although the academic sector provides capacity development on economic issues, there is an insufficient supply of initiatives in this area, especially the ones that would consist of short and concise courses addressing

the needs of policymakers and SMEs that want to engage in e-commerce

## Socio-cultural issues

Key socio-cultural trends in terms of IG include the threat of terrorism and the use of the Internet by terrorist groups, the balance between privacy and freedom of expression, the impact of algorithms on socio-cultural rights and local content.

Socio-cultural issues are covered by at least 22 of the capacity development initiatives mapped here, most strongly by the IG Schools, universities and civil society. Nevertheless, specific interest in different socio-cultural issues is spread unevenly across the socio-cultural basket. For example, although there is an interest in content diversity and multilingualism, this interest is overall weak in IG curricula, especially considering the increasing importance of the global migration of peoples across continents and cultures, and the growing global challenge of xenophobia and racism. The interplay between social-cultural issues, diplomacy and building trust is important, and it is only addressed by three capacity development initiatives.

While seven of the initiatives show an interest in content policy generally, there is also interest in specific themes, such as online media and the impact of big data on journalism. This is important, particularly in the context of the shifting socio-cultural impact of media on individuals and groups, and the Internet's role on these developments, such as in the emergence of Fake News. This impact is not properly accounted for in IG capacity development initiatives overall.

Table 11: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to economic issues

Economic issues	Organisations that cover issues	Policy Trends	Gaps
E-commerce	EuroSIG ICANN University of Strathclyde Glasgow National Law University - Jodhpur Association of Pacific Rim Universities Link Centre, University of Witwatersrand HIIG, University of Berlin Joint International Doctoral Degree in Law, Science and Technology CTS, FGV University of Cape Town ITC CTO ILO DiploFoundation	E-commerce is being considered a key element to foster development and economic growth.	Coverage of economic issues in general and e-commerce in particular E-commerce is mostly addressed in initiatives from the academia
		Traditional IG policy issues are being included in the multilateral trade agenda.	Coverage of the interplay between trade and digital policy issues.
Taxation	Association of Pacific Rim Universities GSMA CTO	Adjustments are being proposed to taxation policies aimed at their application to e-commerce transactions	Taxation is a scantily covered topic



Table 10: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to human rights issues

Human Rights issues	Some organisations that could cover issues	Policy Trends	Gaps
Privacy and data protection	MEAC-SIG APSIG AfriSIG South SIG ISOC ICANN Central European University University of Strathclyde Glasgow Link Centre, University of Witwatersrand Harvard University HIIG, University of Berlin Joint International Doctoral Degree in Law, Science and Technology CIS, Stanford University of Hong Kong UC Berkeley Universidad de San Andrés GSMA USTTI DiploFoundation	International soft law is further defining states' obligations when it comes to the protection of the right to privacy online.	
		The adoption of national laws that expand investigative powers and data retention and that weaken encryption has been augmenting	Evidence-based analysis of costs and benefits of data retention Capacity building for SMEs on intermediary liability and the responsibility to respect human rights Interplay between data retention, data localisation and jurisdiction issues
		International courts decisions' play an important role in establishing limits to national policies on personal data collection	
		Free flow of data is key to the sustainability of trade and of a large number of ICT companies	Interplay with data localisation and e-commerce laws
Freedom of expression	MEAC-SIG AfriSIG APSIG South SIG University of Strathclyde Glasgow Central European University Alexander von Humboldt Institute for Internet and Society, University of Berlin MIT - Center for Civic Media American University, Washington Centre for Communication Governance at National Law University, Delhi APC	Internet disruptions are on the rise, often for reasons related to security and the protection of local businesses	
Other human-rights related issues		Human Rights are affected by private networks and platforms that are created, maintained, and operated by ICT sector companies and organisations	Capacity building on human rights standards that apply to the private sector (e.g. UN Ruggie Principles)

## Human Rights

As suggested in chapter 1, key human rights trends globally include the obligations of states regarding privacy online; states extending their powers regarding data retention, with international court decisions limiting these powers; data flow and trade, and the disruption of the Internet for security and business reasons. The relevance of privacy is reflected in the majority of the courses that deal with human rights issues mapped here. This includes IG schools, the technical community, universities and civil society. International organisations show a comparatively lower interest in privacy issues, or human rights issues overall – but one can assume that the human rights framework is referenced by at least the ILO and the other UN organisations mapped here. Our mapping shows that IG schools, universities and civil society also retain a strong interest in freedom of expression issues. Less dealt with, however, are gender rights,

the rights of people with disabilities, the rights of children,<sup>1</sup> issues such as access to information, and an understanding of global and regional human rights frameworks, mechanisms and charters generally.

In particular, the lack of attention to gender rights in IG training is a concern. It is also notable how very few courses cover the rights of marginalised communities – including people with disabilities, as well as indigenous communities, poor people, and those who do not speak dominant languages such as Mandarin, English, Spanish, French and Portuguese.

### Summary of content gaps (Table 10):

- Gender rights and the rights of children
- Rights of marginalised communities
- Human rights instruments, charters and protocols
- Advanced technologies and their impact on human rights

<sup>1</sup> Despite the high attention given to this at the IGFs.

## Face-to-face trainings:

Face-to-face capacity development is provided by technical organisations in many different formats, usually in an ad-hoc manner. LACNIC, the RIPE NCC and AFRINIC stand out for providing periodic and structured in-person capacity development, following a pre-defined curriculum. The duration varies from 1 to 3 days for RIPE NCC and LACNIC and up to 5 days for AFRINIC's IPv6 certification training.

Face-to-face trainings are usually offered in different cities, by means of a partnership with local hosts. AFRINIC encourages third party organisations to offer workshops in their cities, by providing support that encompasses the selection of modules, the provision of training material (slides and exercises) and assistance to adapt them to local needs.

The in-person trainings offer a blend of presentations and practical exercises. All the training material (texts, videos, slides and exercises) are made available online by AFRINIC and the RIPE NCC. Nevertheless, their licensing regime is not specified.

Participants do not need to pay to take part in the in-person trainings offered by these organisations. In the case of the RIPE NCC, the course is offered on a member-only basis and the cost is covered by the membership fee.

There is little information on the certification policy with regards to in-person training. Among the organisations analysed, AFRINIC's course on IPv6 is the only one that clearly provides an 'IPv6 Forum Certified Certification (Gold)'.<sup>5</sup>

## Other types of capacity development

Some organisations from the technical community also include the organisation of webinars (RIPE NCC) among their capacity development efforts and the creation and curation of a list of resources – such as tutorials (IETF) or documents for general education (ARIN). These initiatives were not included in the scope of this research (see annex I on methodology), however, it is valuable to take note of them.

Webinars, in particular, may be complementary to other capacity development efforts. While the content of IG courses is usually defined in advance and cannot be easily changed to accommodate emerging issues, ad-hoc webinars provide the dynamism to tackle the 'hot topics' related to IG and digital policies. They also allow organisations to gather the knowledge and expertise that will give them the possibility of including some of these emerging issues on the curricula of their future training initiatives.

<sup>5</sup> The IPv6 Forum a worldwide consortium, with a key focus of providing technical guidance for the deployment of IPv6. The IPv6 Forum 'IPv6 Education Certification Logo Program' objective is to encourage and accelerate the adoption of IPv6 in the curricula of the universities, vendor training programs and training specialists.

There are activities of capacity development provided by the technical Internet community that consist of policy immersion, such as the ISOC ambassadors program, the IETF tech policy fellows and the IETF policy fellows. The latter two initiatives are organised by means of a partnership between the IETF and ISOC. The tech policy fellows programme aims to include young engineers from developing countries in the IETF meetings, in order to strengthen the global diversity of the organisation. The fellows take part in a week of intensive training that helps them understand how the IETF standard-development policy works and how to get involved.

The policy fellows programme was created in 2012, influenced by discussions at the World Conference on International Telecommunication (WCIT). In the midst of controversies surrounding IG-related topics at WCIT, some technical Internet organisations believed that the dialogue with policymakers would benefit from a space of knowledge-sharing about the work being developed by the technical community, in fora such as the IETF. Since 2013, the IETF has made a point of inviting 15 to 20 highly-ranked policymakers, mostly from developing countries, to take part in the IETF's meetings. They participate in a one-week training on topics ranging from interconnection issues to encryption, privacy, IoT and the history of Internet development.

## Content covered by the technical community:

Chart 1 shows the number of sampled organisations from the technical Internet community that cover the IG baskets and their subtopics (see chapter 1 for an explanation on the IG taxonomy).

Organisations from the technical community can be divided into two groups when it comes to the content of their capacity development: a) those that provide an holistic training and, among other goals, aim to introduce newcomers to IG policy space; and b) those that provide a more in-depth specialisation on a narrower set of themes that fall strictly within the scope of their organisational mission.

ISOC and ICANN can be included in the **first subset of capacity development initiatives**. The capacity development initiatives offered by both organisations span across several IG baskets and also include introductory topics, such as an overview of the history of IG and the actors who are part of the ecosystem, and the most important processes and fora in which IG issues are discussed.

Many of the themes encompassed in the **infrastructure basket** are covered in the ISOC Inforum course, from telecommunications regulation to the administration of IP numbers, DNS, the development of standards and network neutrality. ICANN focuses on the DNS, IP numbers and protocols.

When it comes to **security**, some of ISOC's Inforum courses touch upon aspects that other technical organisations do

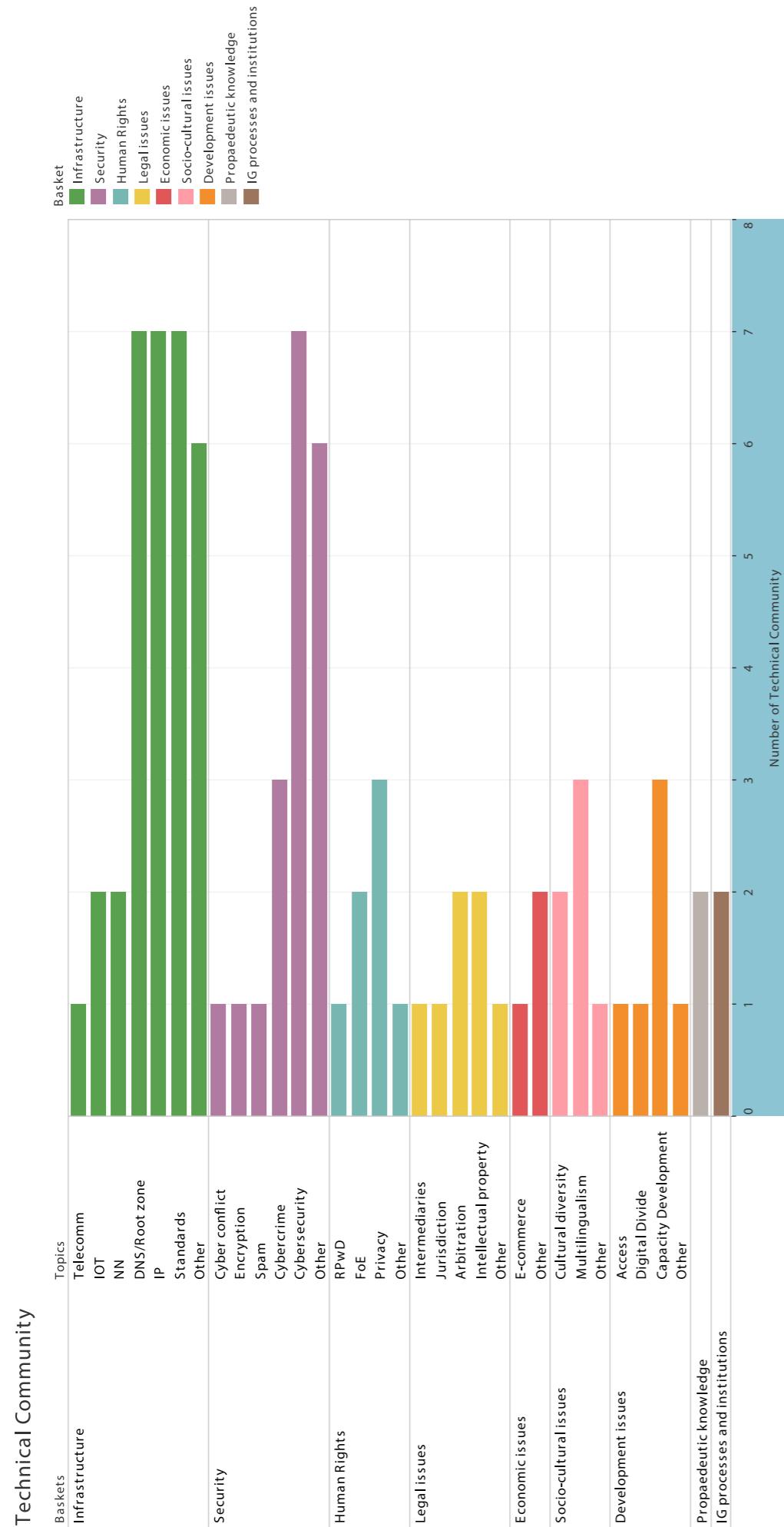


Chart 1: Coverage of IG baskets by the technical Internet community

### Summary of content gaps (Table 8):

- Several themes remain considerably less covered by capacity development such as encryption, the protection of critical Internet infrastructure or spam
- Fostering a multistakeholder approach to the discussion of security issues
- There is a need to cover cybersecurity issues from international relations and diplomatic standpoints

### Legal issues

Legal issues are well-represented by IG capacity development initiatives mapped here (at least 42 deal with this basket), most notably by universities and international organisations. The academic sector offers general courses on 'law and technology' or 'law of communications' in which an overview of the legal challenges is provided.

There is special emphasis on intermediary liability and intellectual property and many courses are focused on the protection of copyright over works on digital formats and on the tension between copyright protection and access to

knowledge. Although discussions on jurisdiction transversally appear on many of the IG policy discussions, specific courses which aimed to deal with this aspect were not identified.

Labour issues are also poorly covered, in spite of the questions posed on the status of workers by the new arrangements of dis-intermediation made possible by technology, such as the sharing economy. Although there are courses examining the legal implications of emerging technologies, such as law and robotics, they are still very few in number.

New courses are emerging on the interplay between legal and security issues, such as digital forensics. Of the remaining legal issues covered in IG capacity development, there is marginal but still evident interest in the new terrain for legal exploration such as robotics and biotechnology.

### Summary of content gaps (Table 9):

- There is a gap in legal discussions on jurisdiction, arbitration and labour issues in IG capacity development initiatives
- There is a need to strengthen discussions on the legal impact of new technologies in IG capacity development initiatives

Table 9: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to legal issues

Legal issues	Some organisations that could cover issues	Policy Trends	Gaps
Jurisdiction	MEAC-SIG EuroSIG APSIG University of Oslo National Law University - Jodhpur Oxford Internet Institute Link Centre, University of Witwatersrand HIIG, University of Berlin Harvard University DiploFoundation Internet and Jurisdiction Project	Conflicts involving jurisdiction will become increasingly important	Capacity development focused on jurisdiction. The impact of technology on labour.
		The rulings and guidelines are increasingly shaping the sharing economy, including labour law aspects	
Intermediaries	AfriSIG APSIG ISOC Central European University University of Strathclyde Glasgow HIIG, University of Berlin Harvard University Nexa, Politecnico di Torino Joint International Doctoral Degree in Law, Science and Technology National Law University, Delhi CIS, Stanford CTS, FGV APC DiploFoundation CTO	The limits of intermediary liability are still being defined, especially when it comes to the protection of intellectual property rights	The theme is mostly covered from a communications angle but it is not thoroughly discussed from a legal standpoint.
		Social media platforms may be included within the framework of media companies	
Intellectual Property	University of Strathclyde Glasgow HIIG, University of Berlin Harvard University Nexa, Politecnico di Torino Joint International Doctoral Degree in Law, Science and Technology National Law University, Delhi CIS, Stanford University of Hong Kong CTS, FGV University of Cape Town WIPO ILO	Alternative models for collecting the revenues of authors for online distribution of their work are under discussion	

Table 8: Correlation of policy trends, capacity building gaps and actors that could potentially address them with regards to security issues

Security issues	Some organisations that could cover issues	Policy Trends	Gaps
Cybersecurity	ISOC LACNIC RIPE NCC AFRINIC APNIC ICANN MEAC-SIG APSIG AfriSIG Euro SIG South SIG Some Coursera courses Central European University University Sains Malaysia (USM) National Law University - Jodhpur HIIG, University of Berlin Harvard University Joint International Doctoral Degree in Law, Science and Technology Georgia Tech American University ITP, Colorado University of Hong Kong Universidad de San Andrés Microsoft Corporation Cisco Systems AT&T Intel Corporation USTTI Global Partners Digital DiploFoundation ITU UNODC	Security concerns related to the Internet of Things (IoT) connected devices are increasing.  Distributed Denial of Service (DDoS) attacks continue to increase in size, frequency, consistency and complexity.	Co-relation between discussions related to infrastructure (ie. security related to protocols) and other aspects The basic steps that the common person could take to practice 'digital hygiene' of their connected devices.
Cybercrime	South SIG EuroSIG MEAC-SIG ISOC ICANN University of Strathclyde Glasgow National Law University - Jodhpur Joint International Doctoral (Ph.D.) Degree in Law, Science and Technology University of Hong Kong Universidad de San Andrés Microsoft Corporation DiploFoundation Together Against Cybercrime (TaC) ITU Academy UNODC	National cybersecurity strategies are being developed or improved to face cyber threats.  Cybersecurity laws are giving more power to law enforcement bodies.  Bilateral cooperation on cybersecurity is increasing between countries.	Content offered at different levels to cater to different audiences (ie. beginners, policymakers, law professionals, etc). A comparison among national strategies and identification of good practices. A comparison among frameworks of bilateral cooperation. Capacity building to law enforcement that includes digital policy principles (e.g. openness, end-to-end) and human rights principles.
Cyber conflict	EuroSIG ISOC Global Partners Digital	At the international level, cyberspace is increasingly seen as the fourth military operational domain, in addition to air, land and sea.  Controls on exports of certain dual-use goods and technologies is being strengthened.  Concerns with the security of critical infrastructure is increasing.	Coverage of cybersecurity issues from international law, international relations and diplomatic standpoints
Encryption	ISOC Central European University University Sains Malaysia	The adoption of encryption by online platforms and the use of HTTPS is increasing.	Policy aspects and technical aspects jointly analysed
Child online safety	University of Strathclyde Glasgow GSMA DiploFoundation TaC USTTI	Stakeholders are increasingly collaborating on child safety measures.	Capacity development on child safety.

not cover in capacity development, such as cyber conflict, encryption and spam. It also includes cybersecurity and cybercrime. ICANN covers topics related to security in their fellowship program (such as DNSSEC, for example) or in ICANN Learn, through courses provided by third parties and endorsed by the organisation.

Among the issues related to **human rights**, the right to privacy in particular, is tackled by ISOC in some of its courses, such as managing the digital fingerprint, for example. Human rights issues have received increasing attention from ICANN. Certain policies, such as the WHOIS database and the obligations of data collection imposed by ICANN's Registrar Accreditation Agreement (RAA) have raised privacy concerns. Courses offered in ICANN Learn and lectures included on the fellowship program on the WHOIS and the RAA touch upon privacy issues. Privacy is also one of the topics encompassed in the ICANN Learn course on Digital Commerce and Global Internet Governance. Some parts of the ICANN community point out that a wider set of human rights are being impacted by the work of the organisation<sup>6</sup>, however, it was not possible to verify whether these concerns have percolated into the content of ICANN Learn or ICANN fellowship programme.

The **legal issues** covered by ISOC and ICANN in capacity development encompass domain name dispute resolution, especially in cases concerning trademark rights. In addition to that, ISOC's courses touch upon intermediary liability and ICANN's contract-based relationship with registries and registrars introduces the topic of contractual compliance.

When it comes to **economic issues**, ICANN covers aspects of the development of the domain name industry and one of the courses in the ICANN Learn database is dedicated to Digital Commerce and Global Internet Governance. In ISOC's Inforum courses, economic issues are not prominently tackled.

Among the topics included in the **socio-cultural basket**, multilingualism is covered by the capacity development of both organisations, and ISOC also includes cultural diversity in its program. While ICANN focuses on the development and implementation of Internationalized Domain Names (IDNs), ISOC introduces the student to the technical standards that enable internationalisation. It also highlights the production of local content and its relation with sustainable innovation.

When it comes to the **development basket**, ISOC's Inforum courses put emphasis on providing access to the unconnected and bridging the digital divide. ICANN offers courses focused on capacity development, which aim to help newcomers navigate the ICANN institutional processes and

<sup>6</sup> See the work published by the Cross-Community Working Party on ICANN's Corporate and Social Responsibility to Respect Human Rights: <https://community.icann.org/display/gnsononcomstake/CCWP+on+ICANN'S+Corporate+and+Social+Responsibility+to+Respect+Human+Rights>

courses that help them make the most of the capacity development opportunity offered by ICANN Learn.

The **second subset of the capacity development initiatives** offered by the technical community aims to provide a more in-depth specialisation on a narrow set of themes encompassed in the **infrastructure basket**. This type of capacity development is mostly provided by regional Internet registries (RIRs) – (LACNIC, AFRINIC, APNIC and the RIPE NCC) and W3C. The courses are usually targeted at specific groups of professionals, with previous knowledge or practical involvement in the field. W3C is focused on web standards, while all RIRs cover aspects related to IP numbers, DNS and their related standards. Courses are usually offered in tiers, according to their complexity (ex: basic, intermediate and advanced).

IPv6 management, deploying, testing and troubleshooting seem to be part of all trainings. Most of the RIRs offer training on their own number resources policy and governance. Some capacity development initiatives have distinguishing features. LACNIC, for example, touch upon IPv6 and IoT. AFRINIC offers a module on Fostering IPv6 strategy in companies and governments in its IPv6 course, aiming to 'drive IPv6 adoption from the executive/managerial top', which is targeted at government regulators, IT advisors, executives and managers. The duration of the courses, the level of complexity with which the themes are dealt with and the approach to certification varies (see previous section).

Most of the courses offered by the RIRs touch upon at least one type of technical standards: IP standards, IP security protocols, BGP routing protocol or RPKI. W3C concentrates its courses on web standards, such as HTML5, Java and CSS. The course description is clearly geared towards the practical and professional application of the knowledge acquired, in web designing, game developing or web design for mobile devices.

**Security aspects** are included in the capacity development initiatives of all RIRs, more specifically the issues that fall within the scope of their mandate, such as the security of IPv6. Some courses also touch upon other security-related points, such as the creation of Computer Emergency Response Teams (CERTs) and Computer Security Incident Response Teams (CSIRTs).

It was not possible to clearly identify the coverage of topics related to **Human Rights, Legal aspects, Economic issues and Socio-cultural issues** in the capacity development initiatives of RIRs and W3C. When it comes to **development**, LACNIC and AFRINIC seem to have the goal to multiply development-oriented capacity development initiatives by capacitating and supporting trainers.

Table 1: Summary of sampled technical Internet organisations offering capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
ISOC	Infrastructure Security Human rights Legal issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	eLearning platform; Next Generation Leaders (NGL) programme; tutorials	Online; blended	All stakeholders
LACNIC	Infrastructure Security Development issues	Campus online courses; webinars; workshops	Online; face-to-face	All stakeholders
RIPE NCC	Infrastructure Security	RIPE NCC Academy online courses; training courses	Online; face-to-face	All stakeholders; members (for training)
AFRINIC	Infrastructure Security Development issues	Workshops	Face-to-face	Network engineers and architects, network technicians and system administrators, support staff, executives and managers; government regulators; IT advisors to government officials.
APNIC	Infrastructure Security	Online classes	Online	Systems administrators and those involved in DNS operations
ICANN	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	ICANN Learn; fellowship programme	Online; face-to-face	All stakeholders
W3C	Infrastructure	W3Dev Campus courses; MooCs edX	Online	Specific to each course, previous knowledge required; all stakeholders
IETF/ISOC	Infrastructure	IETF tech policy fellows and the IETF policy fellows IETF ambassadors	Policy immersion initiatives, face-to-face and blended	Young engineers from developing countries highly-ranked policymakers, mostly from developing countries All interested stakeholders

## The academic sector

### General overview

Providing a sample mapping of university initiatives that deal with capacity development on IG has a number of methodological challenges. The sample was narrowed down to courses that have an IG component (programmes that focus on at least one of the IG baskets identified in chapter one) and courses that present an interplay between Internet and policy. Not narrowing down the sample would have meant the mapping of each university course that dealt with telecommunications or the Internet or associated issues, which is beyond the scope of this study.

The selected sample encompasses: a) academic institutions that are steering committee participants of the Network of Internet and Society Research Centers (NoC)<sup>7</sup>; b) other academic institutions that offer relevant capacity development initiatives, which were identified by means of desk research

<sup>7</sup> Seven steering committee participants of the Network of Centers are: Alexander von Humboldt Institute for Internet and Society (HIIG), Berlin, the Berkman Center for Internet & Society at Harvard University, Cambridge, MA, the Keio International Project for Internet & Society, Keio University, Tokyo, the MIT Center for Civic Media, Cambridge, MA, the Nexa Center for Internet & Society, Politecnico di Torino, the Oxford Internet Institute (OII), University of Oxford And The Center for Technology & Society (CTS) at Fundação Getulio Vargas (FGV) School of Law, Rio de Janeiro. For the purpose of this research the Centre for Internet & Society (CIS), Bangalore, a non-profit research organisation which is not attached to a university has been included on the civil society sample.

Infrastructure issues	Some organisations that could cover issues	Policy Trends	Gaps
Cloud computing	EuroSIG South SIG DiploFoundation GIP Cisco Microsoft University Sains Malaysia ITP, Colorado University of Hong Kong ITU Internet and Jurisdiction	The global cloud computing market is accelerating.	Jurisdiction issues. (Legal) mechanisms for requesting co-operation from public authorities and companies that have jurisdiction over data. Data localisation versus enabling conditions to attract data centres to developing regions.
IoT	DiploFoundation Univ of Oslo APNIC LACNIC EuroSSIG APSIG MEAC-SIG GIP Cisco GSMA University Sains Malaysia HIIG, University of Berlin Nexa, Politecnico di Torino ITU	The IoTs will continue its trajectory of growth.	Infrastructure and networks that will enable the IoT. IoT and IP numbers. Standardisation of the IoT. Security of connected devices. SMEs' readiness for devising IoT strategies. Human rights implications of an IoT connected society.
Network neutrality	South-SIG MEAC-SIG APSIG ISOC DiploFoundation GIP ITU CIS, Stanford University of Strathclyde Glasgow	The implementation of the network neutrality principle remains under discussion.	The operationalisation of network neutrality from a technical standpoint. Strengths and weaknesses of regulatory models that introduced network neutrality. Economic consequences of business models that introduce zero rating, for example.
Convergence	GSMA DiploFoundation GIP Cisco CTO UC, Berkeley CIS, Stanford Georgia tech Nexa, Politecnico di Torino	The regulation of over-the-top services (OTT) is being discussed in several regions.	Pros and cons of applying Telecom law to OTTs. Competition issues. Socio-cultural impact of OTTs.
		There is increasing interplay among three technology sectors – AI, IoT, and big data. The implications of automation and artificial intelligence (AI) are being increasingly discussed	Big data and deep learning. The ethical dimension of AI. AI and automation of jobs.

such as encryption, the protection of critical Internet infrastructure or spam. Child online protection is mostly tackled by organisations whose mission is related to the topic.

Capacity development organised by civil society usually tackles the interplay between promoting security and the protection of rights. This aspect is also emphasised by some academic courses, although the trend to provide certification for the job market has made the cybersecurity curricula increasingly oriented towards market skills.

The policy discussions related to security in general present less participation from non-state actors. One of the aims of capacity development, especially the initiatives promoted by civil society, is to skill individuals to take part in cybersecurity-related discussions and foster a multistakeholder approach, but there is less focus on that from other stakeholder groups.

The majority of discussions related to cybersecurity and cyber conflicts take place in multilateral spaces, such as UN committees, bilateral talks and diplomatic settings. Most of the capacity development does not cover fora such as the Munich Security Conference, the UN Group of Governmental Experts (UN GGE) or the bi-annual Global Conference on Cyber Expertise. Some exceptions are the capacity development provided by Global Partners Digital and DiploFoundation.

The cybersecurity field shows the most collaboration among different sector in the provision of capacity development, such as governments, companies and the academic sectors. These frameworks could inspire partnerships in other fields.

Table 7: Correlation of policy trends, capacity building gaps, and actors that could potentially address them with regards to infrastructure

Infrastructure issues	Some organisations that could cover issues	Policy Trends	Gaps
Telecommunications	GSMA ISOC MEAC-SIG EuroSSIG APSIG AfriSIG South-SIG APC USTII CTS, FGV ITP, Colorado CIS, Stanford Georgia Tech Univ. of Strathclyde Glasgow DiploFoundation GIP ITU CTO	Major Internet companies, such as Google and Facebook, have started to play a key role in the deployment of Internet infrastructure.  There are concerted efforts to facilitate 5G spectrum allocation, deployment and standardisation.	Analysis of the introduction of these new players and potential impact on regulation, economic model and development.  Technical and policy enablers of 5G deployment. Infrastructure as enabler of other technologies such as the IoTs.
Critical internet resources (IP numbers and DNS)	ICANN RIRs ISOC AfriSIG EuroSSIG South-SIG MEAC-SIG Coursera Univ. of Oslo DiploFoundation GIP I&J USTII University Sains Malaysia University of Strathclyde Glasgow National Law University – Jodhpur Nexa, Politecnico di Torino Georgia Tech American University, Washington CIS, Stanford CTS, FGV Cisco Systems ITU ILO	Governments have increasingly tampered with Internet infrastructure as a way of achieving enforcement.  Organisations are intensifying their efforts to encourage IPv6 adoption.	Legal mechanisms used to celebrate public/private co-operation. Accountability and due process. Jurisdiction: the potential extra-territorial effects of actions that interfere with Internet architecture.  An approach to capacity development that is IPv6-centred. Capacity development for decision-makers and managers in the public and private sectors. Case studies on regional good practices and lessons learned.
Standards	W3C RIRs IETF ICANN ISOC APNIC AFRINIC APSIG AfriSIG EuroSSIG South-SIG University of Oslo DiploFoundation GIP Cisco Microsoft Coursera University Sains Malaysia Harvard University Nexa, Politecnico di Torino American University ITP, Colorado Microsoft Cisco ITU	There is an increasingly clear but yet insufficient perception of the interrelation between technical standards, ethics and human rights.	Guidelines on the responsibility to respect human rights (which encompass the private sector). Case studies on current initiatives to analyse the interplay between standards and human rights (ex: IETF).

and interviews conducted with experts<sup>8</sup>. In order to reinforce the regional diversity of the sample, the database of members of the Global Internet Governance Academic Network (GigaNet) was scanned with the aim of identifying additional relevant academic institutions that provide capacity development on IG in the developing world.

According to the feedback received during interviews, IG-specific degrees or courses are not abundant in academia in both Africa and Latin America and the Caribbean (LAC), which is reflected in our mapping. However, one interviewee suggested that it is likely that IG-related issues could be discussed in some courses, such as those dealing with telecommunications. Interviewees also suggested that it was difficult to find supervisors for students wanting to pursue high-level academic studies in IG in Africa, LAC and even in Asia, although our scan suggests a stronger support for students in Asia than suggested by interviewees.

Efforts to map the academic sector were confronted with a diverse field. Capacity development is offered in: a) Master and PhD programmes; b) academic courses, conducted face-to-face, online<sup>9</sup> or in a blended format<sup>10</sup>, as a degree or non-degree<sup>11</sup> course; c) academic courses provided through Coursera; d) academic immersion through fellowships and internships, helping students develop projects and research on the field of IG.

The **duration of the courses** varies. For example, the course offered by the Central European University is 7 days long, Link Centre's course is 4-6 months, while MA-level courses are one to two years long. PhD courses are generally 3 years long. Full-time and part-time options are starting to be available at the postgraduate level, which also impacts the duration of the programmes. Class sizes for the courses appear to be ideally set at 20-25 people.

When it comes to the **selection of participants**, some courses establish a profile of the type of student they would accept, while others are open to the general public, or aim to achieve stakeholder diversity. The **University of Strathclyde Glasgow** accepts graduates in law to its LLM degree, as well

<sup>8</sup> 18 additional universities identified were: Georgia Institute of Technology; American University, Washington; Centre for Communication Governance at National Law University, Delhi; Stanford University; University of Colorado-Boulder; University of Hong Kong; UC Berkeley; Universidad de San Andrés, Buenos Aires; the University of Cape Town; the Central European University; the University of Oslo; the University of Helsinki; Universiti Sains Malaysia (USM); University of Strathclyde Glasgow; National Law University, Jodhpur; the Link Centre, University of Witwatersrand; the Joint International Doctoral (Ph.D.) Degree in Law, Science and Technology; the Association of Pacific Rim Universities.

<sup>9</sup> Under this category, courses can be based on weekly live lectures, so participants move forward together as a group, or can be self-paced and allow more time flexibility to participants. The latter usually have a deadline to be completed (ex: a semester).

<sup>10</sup> Most of the courses can be taken online, but participants need to meet at the university campus for an intensive face-to-face interaction.

<sup>11</sup> A non-degree enrollment status is designed for students who wish to take courses but do not plan to pursue a degree.

as other qualifications that are relevant to the field of study. Both the University of Oslo and National Law University of Jodhpur offer an IG-course at a Master's level in which prior study in law is needed. Likewise, the **Law & Technology Centre of University of Hong Kong**, for example, offers an LLM Programme in Information Technology and Intellectual Property Law which is designed for students with law degrees or for IP or IT professionals with relevant legal experience. The **Digital Economy Initiative** targets international organisations, governments and business. The **Link Centre** is open to students with different backgrounds and looks to foster multistakeholder participation in their courses. The **Central European University** seeks to attract 'advanced' MA students, and PhD students to its course, but they are expected to interact with multistakeholder participants.<sup>12</sup>

The syllabus or at least a description of most university courses are available online, however, **course materials, such as texts and presentations, are usually not available**, with the exception of open courses conducted online (usually in the format of MOOCs). **Academic courses frequently offer insights into the discussions that are prominent in a particular region.** The Link Centre<sup>13</sup> focuses on Africa, the Digital Economy Initiative on Asia-Pacific, and the University of Oslo on EU legislation, for example. The Law & Technology Centre at the University of Hong Kong offers an LLM Programme in Information Technology and Intellectual Property Law that covers local legal aspects as well as those in mainland China.

**Capacity development initiatives in the academic sector also seek to partner with actors from other stakeholder groups.** An illustration of this is the Association of Pacific Rim Universities' Digital Economy Initiative, which promotes a multistakeholder discussion on the Internet economy. Research as a way of building knowledge capacity in the stakeholder community is part of both Link Centre and the Digital Economy Initiative agendas. The Joint International Doctoral (PhD) Degree in Law, Science and Technology also counts on the support of several 'industrial partners', such as IBM.

**In the field of cybersecurity, there are several examples of partnerships between universities and governments.** Among them, are the following initiatives:

<sup>12</sup> The Central European University aims to attract 'communication, human rights, or technology professionals, researchers, policy advocates, media lawyers, technologists and human rights activists working in policy advocacy organisations, NGOs, media development agencies; as well as policy-makers, activists, academics (including PhD student and advanced MA students), journalists or other media practitioners with demonstrated interest in communication policy change'.

<sup>13</sup> The Link Centre's IGia initiative is at the proposal stage, although course information is available online. According to the centre, they would like to implement the initiative in the future. We have included it here because it shows the basket of thematic concerns in the region in the IG space.

- Since 2011, the German Ministry of Education and Research (BMBF) has been sponsoring research in cybersecurity as well as supporting a group of educational institutions in this realm: the German Cybersecurity Centres. In the framework of these institutions, the BMBF, in collaboration with the Ministry of the Interior (BMI), has been supporting cybersecurity certification.
- The Korea University Graduate School of Information Security was established in 2000 in partnership with ministries and the police as well as other partners such as Samsung and the US Department of Defense (DoD). The curriculum focuses mainly on technical aspects including cryptography, networks, and new technologies, with some elements of cyberlaw, and incident response.
- Estonia has created the Information Technology Foundation for Education (HITSA – Hariduse Infotehnoloogia Sihtasutus). It is a PPP with the Ministry of Education and Research and universities on one hand, and Estonian ICT companies on the other. The programme aims to develop ICT competences on all levels of education. It also aims to teach ICT in graduate programmes not only in cybersecurity and ICT, but also with an emphasis on domains ranging from health to smart housing and materials where ICT can add value.

**Governmental certification of universities is expanding in the field of cybersecurity**, in parallel to initiatives of certification from the private sector (which will be explored in more detail in the section about capacity development offered by the private sector).

Two countries have decided to certify and label universities and study programmes: the USA and the UK. In the USA, for example, all universities are eligible for the Center for Academic Excellence in Cyber Defense certificate (CAE), under four categories: technical institutions, universities, research qualified institutions, and specialised research institutions. The certificate provides formal recognition from the United States Government, along with the prestige associated with that. In order to be accredited, universities must fulfil certain criteria, such as establishing a cybersecurity institution on their premises and teaching in-depth courses aligned with the Cybersecurity Workforce Framework 2.0<sup>14</sup>, which aims at increasing the size and capability of the US cybersecurity workforce.

### Master and PhD programmes

It is challenging to identify post-graduation programmes which are explicitly focused on IG issues. One exception is the Master in Contemporary Diplomacy with an IG specialisation,

offered by the **University of Malta and DiploFoundation**. The programme adopts a blended learning approach, as it starts with a 10-day residential workshop in Malta, followed by 16 to 20 months of online study. Students are required to take compulsory courses in the IG area, which include Introduction to Internet Governance, and Cybersecurity or Internet Technology and Policy: Challenges and Solutions. The Master's programme is accredited through the University of Malta's Department of International Relations, and the programme's credits are transferrable through the European Credit Transfer System, a system that facilitates student mobility across Europe. The credit courses are also offered as certificate courses by DiploFoundation, a model that will be further explained in the section on civil society initiatives.

IG (or issues encompassed under the IG umbrella) are also tackled in courses taught in post-graduate programmes that present a broader scope, such as 'information and communications studies'.

One example is the Communication Studies division of the **American University, in Washington, DC**, which offers interdisciplinary degree programmes at the Master's, and doctoral levels. The School of Communication and the School of International Service jointly offer an interdisciplinary Master's degree that provides an understanding of how international media operates and the economic, cultural and geopolitical roles of global communication. The Internet is transversal to the programme, which aims at 'defining and shaping communications for the digital age'.<sup>15</sup> The doctoral programme presents a more pronounced emphasis on IG issues. It offers an interdisciplinary curriculum focused on the intersections of media, technology, and democracy. Students 'ask questions that range from the use of social media in revolutions, to the construction of identity, and to the implications of policies and design on participatory culture'.<sup>16</sup>

The **PhD programme at the American University** offers an area of concentration in IG and an area of concentration in Technology, Culture and Social Change, which is inclusive of IG related topics. Students benefit from the opportunity to familiarise themselves with the work being conducted by the **Internet Governance Lab**<sup>17</sup>, a centre created by means of a cooperation between American University's School of Communication and School of International Service. The centre combines the development of original and evidence-based research with a hands-on approach to IG discussions and policy formulation.

<sup>15</sup> American University. M.A. in International Media. Available at: <http://www.american.edu/soc/communication-studies/degrees/MA-INTM-SOC.cfm>

<sup>16</sup> American University. PhD programme in communication studies. Available at: <http://www.american.edu/soc/communication-studies/degrees/phd-in-communication.cfm>

<sup>17</sup> <https://Internetgovernancelab.org/>

## Chapter 3:

# An analysis of supply and demand for capacity development: strengths, weaknesses, gaps and opportunities

### Thematic gaps in capacity development

Major IG training initiatives offered by various stakeholder groups are mapped in this study. Gaps have been identified in some thematic areas and in terms of the target audience. There are also gaps when it comes to the breadth of the capacity development that is in supply, which encompass several initiatives of personal and professional training but not so many comprehensive programmes of capacity development (see definition of capacity development in chapter 1).

This chapter includes tables that correlate the IG baskets and policy trends identified in chapters 1 and 2 with the substantive gaps identified in capacity building initiatives, summarised in chapter 3. It also includes a non-exhaustive list of organisations that could potentially play a role in filling these gaps since they are currently providing capacity building in related areas.

### Infrastructure

Most of the capacity development initiatives included in the sample of this mapping exercise touch upon at least some of the points included in the infrastructure basket. Introductory courses to IG, for example, usually provide a basic explanation of how the Internet works. This knowledge is useful not only for understanding the technical aspects, but also as a foundation for the study of other areas, such as cybersecurity and legal themes, which may also require elementary knowledge of infrastructure elements such as the nature of an IP number and of DNS.

In-depth technical knowledge on topics such as telecommunications, IP, DNS, standards and protocols are usually well provided. The interplay of these themes with security aspects is well addressed, but there is still little correlation with other baskets, such as human rights. With the exception of telecommunications, which is frequently addressed from technical as well as policy angles, a connection between the technical aspects and public policy aspects is not well established. An example of how this could be done is the IPv6 course provided by AFRINIC, targeted at decision makers

and company managers, in order to explain the importance and possible strategies for IPv6 deployment.

Infrastructure discussions cover traditional issues, such as the deployment of connectivity in underserved areas. There is less information about what kind of infrastructure will enable future networks that will support technological developments such as the IoTs and how this infrastructure can be fostered in developing countries.

While issues such as cloud computing are increasingly important from an IG policy perspective, the topic is covered from a technical standpoint (technologies to enable virtualisation). Legal implications of cloud computing, the opportunities and challenges posed by data flows and business models, for example, are not so well covered.

### Summary of content gaps (Table 7):

Little correlation between the infrastructure basket and other baskets, such as human rights

- The connection between technical aspects and public policy aspects is not well established
- The required infrastructure to support technological developments such as the IoTs and smart cities
- Table 7: correlation of policy trends, capacity building gaps, and actors that could potentially address them with regards to infrastructure

### Cybersecurity

Among the IG baskets, cybersecurity is the one receiving the most attention in capacity development. The topic is part of introductory courses, which usually address cybersecurity and cybercrime from a general standpoint. Courses focused on infrastructure themes, such as IP, standards and cloud technology usually deal with how security can be strengthened from a technical standpoint.

Several themes encompassed in the cybersecurity basket remain considerably less covered by capacity development

Table 6: Summary of IG schools' offer of capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
MEAC-SIG	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues	School of IG	Face-to-face	All stakeholders
South-SIG	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	School of IG	Face-to-face	All stakeholders
EuroSSIG	Infrastructure Security Human rights Legal issues Economic issues Development issues Introductory knowledge IG processes and institutions	School of IG	Face-to-face	All stakeholders
AfriSIG	Infrastructure Security Human rights Legal issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	School of IG	Face-to-face	All stakeholders
APSIG	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	School of IG	Face-to-face	Experts (not for beginners)

The lack of clear dividing lines between producing academic outputs and intervening in policy discussions is a characteristic of this field. Many centres have the mission to influence the creation of better Internet policies and to help break the silos between stakeholder groups. The **Georgia Institute of Technology**, for example, hosts the **Internet Governance Project**<sup>18</sup>, which conducts research and analyses global Internet policy issues on blogs and publications. The project aims to inform and shape Internet public policy choices by providing independent analysis and timely recommendations. Georgia Tech also harbours its Internet related programmes under 'information and communication' studies. The Master's programme offered by the School of Public Policy of Georgia Tech offers an area of concentration<sup>19</sup> on 'Information and Communication Policy', which has 'a special emphasis on the Internet'. The doctoral programme offers a research area on 'Information and Communication Technology Policy', which focuses, among other topics, on the development and governance of the Internet, online democracy and telecommunications.

The **complementarity between academic knowledge and policy-making skills** is sought by many programmes and it is a remarkable feature of the **University of Colorado-Boulder's Interdisciplinary Telecom Program (ITP)** which offers very specialised and cross-cutting knowledge on telecommunications technology and policy aspects. The programme offers a PhD in Telecom, a Master's of Science in Telecom, and non-degree certificates, with the aim of strengthening academic knowledge as well as preparing for professional opportunities.<sup>20</sup> Previous academic experience or practical professional experience are both equally taken into account when selecting applicants.

The Master's programme aims to provide students with business, economics, and policy courses in telecommunications for achieving career advancement. By the end of their training, students are also prepared to successfully complete certification tests that demonstrate proficiency in the practical operation of technical equipment. Master's students are expected to follow one of the following tracks:

- Network engineering<sup>21</sup>. The track provides in-depth knowledge on the development and operations of IP networks.

<sup>18</sup> <http://www.Internetgovernance.org/>

<sup>19</sup> A concentration consists of at least three 3-credit courses, of which at least one is the School of Public Policy.

<sup>20</sup> According to the ITP website, 98% of students were employed within 3 months of graduation, earning an average annual salary of USD 85 000. Former students were hired by companies such as Akamai Technologies, Amazon, Apple, AT&T, Cisco, Google, Verizon and the US Army.

<sup>21</sup> This track includes courses on: Network Economics and Finance; Data Communications; Fundamentals of Network Programming; Linux Systems Administration; Telecom Business Strategy; Network Management and Operations; Telecommunications Systems Lab; Principles of Telecommunication Policy; IP Routing Protocols. In addition, students should choose one of the following courses: Data Center

- Wireless networking<sup>22</sup>. The track prepares students to design, build, and operate wireless broadband networks based on technologies such as LTE and WiFi.
- Network security<sup>23</sup>. The track prepares students to be information security professionals who can manage the security of critical electronic information and data communication systems within private or public sector entities.
- Telecom Policy and Strategy<sup>24</sup>. The track is designed to provide exposure to the latest telecommunication technologies, economics, and public policy issues. It gives students a deep dive into telecom policy and regulation through courses in ITP and the Colorado Law School.

With the exception of the PhD degree, which can only be achieved by means of on-campus courses, most of the certificates issued by the University of Colorado-Boulder's ITP can be obtained through the graduate distance learning programme. Distance students get the same graduate degree as on-campus students.

**Harvard University** also offers a combination of courses that can be conducted face-to-face, online or in a blended format. Harvard's continuous education programme holds an extensive catalogue. Their online and on-campus courses can be blended to allow students to:

- Fulfil undergraduate degree requirements.** Online and on-campus course options are available, but the student must complete a minimum amount of credits on campus.
- Fulfil graduate degree requirements.** An example is the **Master's in Software Engineering degree**, which can also be completed through a combination of on-campus and online courses.
- Acquire **professional non-degree graduate certificates.** These courses aim to develop professional and market-oriented skills. Certain courses can also count as electives in a related degree field (e.g. they can count towards achieving a Master's degree). Students need to invest approximately USD 10200 to obtain a certificate and the courses take on average 1 year and 6 months

Networks; Voice Over IP Lab; Voice Network Design and Implementation; Next Generation Networks; Service Provider Networks

<sup>22</sup> This track includes courses on: Network Economics and Finance; Data Communications; Fundamentals of Network Programming; Wireless Systems; Telecom Business Strategy; Wireless LANs; Wireless Systems Lab; Principles of Telecommunication Policy; Wireless and Cellular Communications; Advanced Wireless Lab.

<sup>23</sup> This track includes courses on: Network Economics and Finance; Data Communications; Fundamentals of Network Programming; Applied Network Security; Principles of Telecommunication Policy; Network Security Lab; Secure Web Application Development; Telecom Business Strategy; Large Scale Network Analysis; Secure Embedded Programming; Linux Systems Administration.

<sup>24</sup> This track includes courses on: Network Economics and Finance; Principles of Telecommunication Policy; Internet Lab; Fundamentals of Network Programming; Telecom Business Strategy; Telecommunications Systems; Spectrum Management and Policy; Technology Law and Policy Clinic; Data Communications; Future of Video: Technology, Policy and Economics.

(with the possibility of extending the course to 3 years). One must obtain a minimum of a B grade in each course to receive the certificate.

**Post-graduation in IG-related fields increasingly combines an academic and a market-oriented focus.** An example is the 'Master's in Social Science of the Internet' and the 'Doctorate in Information, Communication and the Social Sciences' provided by the **Oxford Internet Institute** (University of Oxford). Programmes can be pursued on a full-time or part-time basis, helping students to conciliate academic studies and professional activity.<sup>25</sup> The goal to promote professional development is clear in the description of the Master's programme, aimed at 'students wishing to gain the skills and knowledge needed for professional careers in leading technology companies, consulting firms and wishing to pursue a career in Internet communications policy or regulation', or professionals who are already employed in these areas. The doctoral programme is focused on producing original and cutting-edge research, but it is not only targeted at students who wish to pursue an academic career at the university level, but also at 'professionals aiming to reach higher levels of excellence in teaching, research, policy-making, or business in their chosen fields'.

The **University of California Berkeley School of Information** also offers Masters programmes that are clearly geared towards developing skills for the job market<sup>26</sup>, whereas the doctoral degree remains more focused on preparing for an academic career. The Master of Information Management and Systems aims to train students in the skills needed to succeed as 'information professionals'. They familiarise themselves with the theory and practice of storing, organising, retrieving and analysing information in a variety of settings in business, the public sector, and the academic world. The complex policy implications of digitisation, data collection, big data and cloud computing are the backdrop against which the Master of Information and Data Science (MIDS) is offered. It aims to prepare students to work with big data in both private and non-profit organisations. The curriculum brings together social science and policy research, as well as statistics, computer science and engineering. The PhD program in Information Management & Systems is a research-oriented programme in which the student chooses specific fields of specialisation and develops original research culminating in the written dissertation.

The UC Berkeley School of Information also provides a non-degree **Information and Communication Technologies and Development certificate program** which aims to teach students to use ICTs to identify, evaluate, and implement solutions to pressing societal problems in the developing world.

<sup>25</sup> The course content for the part-time and full-time degrees are identical, but the former modality is completed in a longer time.

<sup>26</sup> According to the UC Berkeley website, former students were hired by companies Airbnb, Fitbit, and LinkedIn. 45% reported receiving a promotion and 76% reported receiving a salary increase after the programme.

The course is not a stand-alone certificate, but complements a wide range of existing degree programmes. Upon graduation, the student is issued a certificate for this course in addition to the diploma.

### Other academic courses

The **University of Colorado-Boulder's Interdisciplinary Telecom Program (ITP)** also offers **non-degree certificates**, aimed at professionals and students who are still uncertain whether they want to engage in a full-fledged Master's programme. The certificates attest that the student developed a foundation of knowledge and technical skills highly sought in the job market in the fields of network engineering, network security, wireless networking, and telecom policy and strategy. The courses can count as credits toward a Master's degree if the student decides to engage in a Master's programme.

The aforementioned **professional non-degree graduate certificates** which can be taken online, **offered by Harvard University**, comprise several courses that are relevant from an IG standpoint, such as:

- **Cybersecurity.** Participants are expected to gain a critical understanding of the technological needs, threats and weaknesses in cybersecurity, build knowledge of the tools and protocols needed to use and manage security technologies, as well as gain insight into the legal, social and political dynamics of cyberspace. To earn this certificate the student must complete four courses for graduate credit.<sup>27</sup> This certificate **can be applied towards an Information Management Systems Degree or a Software Engineering Degree.**
- **Data Science.** The student learns to 'analyse data to gain insights, develop new strategies, and cultivate actionable business intelligence in areas as diverse as product design, marketing, and finance'. To earn this certificate the student must complete four courses for graduate credit.<sup>28</sup> This certificate **can be applied towards an Information Management Systems Degree, a Software Engineering Degree or a Journalism Degree.**
- **Programming.** The student is taught the fundamentals of computer programming and language, and gains an understanding of the techniques and tools necessary for software engineering, database management, or website development. To earn this certificate the student needs to complete four courses for graduate credit.<sup>29</sup>

<sup>27</sup> The four courses are: The Cyber World: Hardware, Software, Networks, Security, and Management; The Cyber World: Governance, Threats, Conflict, Privacy, Identity, and Commerce; 2 electives courses among the ones available at: <http://www.extension.harvard.edu/academics/courses/courses-by-certificate/Cybersecurity%20Certificate>

<sup>28</sup> The four courses are Data Science or Elements of Data Science and Statistical Learning With R (required); three electives chosen from the select group, provided that there is only one introductory statistics course and one advanced statistics course.

<sup>29</sup> Students should choose between two possible certificate tracks. Track 1: Intensive Introduction to Computer Science; Data Structures

as fellowships to physically participate in the global or regional IGFs. For some schools, this type of policy immersion is not offered regularly, but depends on the availability of funds each year.

After the training programmes, most of the organisers remain in contact with former participants through a variety of means, including mailing lists, Facebook pages, and WhatsApp groups. As a result, former participants seem to benefit from having access to up-to-date information, including other training and fellowship opportunities in the IG field, which reinforces the networks that the schools help to create. APSIG, the most recently created school, is considering how to approach post-course communication.

### Content covered by IG schools:

The IG schools consistently offer propaedeutic knowledge to IG. Topics such as the history of the Internet, the actors and characteristics of the multistakeholder model are covered by all of them every year. AfriSIG approaches these introductory issues from a regional perspective, discussing the history of Internet development in Africa and the most relevant actors in the African policy landscape.

IG processes and institutions are also part of the introductory module of the IG schools. Some of them, such as the IGF and the WSIS process, are invariably present, whereas the inclusion of others, such as the IANA transition, NETmundial and the ITU plenipotentiary meetings, depend on the context of IG policy discussions.

The non-introductory part of the programme seems to be more flexible from year to year, responding to changes in the IG policy landscape. The programme of South-SIG, jointly determined by the organisers and the hosting organisation,

seems to be particularly open to adjusting the policy priorities in each hosting country, while the programme of EuroSSIG is to some extent more stable<sup>65</sup>, although there are sessions dedicated to addressing future IG challenges. APSIG innovates in the way that it defines its programme. Every year it puts forth a call for proposals for lectures with the aim to foster innovative and high quality courses through the selection of the best lecture proposals. This method also encourages the constant rotation of speakers.

Chart 5 shows the number of IG Schools that cover the IG baskets and their subtopics (see chapter 1 for an explanation on the IG taxonomy).

An analysis of the programmes of the IG schools<sup>66</sup> shows that the themes that they cover span across all IG baskets. This is consistent with the general goal of IG schools, which involve providing a comprehensive knowledge that would enable students to better engage in the field.

A more detailed analysis of the programme shows that some schools cover a larger number of topics comprised in some of the baskets, giving them more weight in the programme. As an example, AfriSIG seems to have been particularly comprehensive in the discussion of human rights, including women's rights and the right to the freedom of association. When it comes to the inclusion of issues comprised in the socio-cultural basket, APSIG's program stands out. Contrarily, topics comprised in the economic basket consistently seem to be less comprehensively covered by all schools.

<sup>65</sup> <https://eurossig.eu/eurossig/background/course/>

<sup>66</sup> For the purpose of this research, the programme of the last three years (2016, 2015 and 2014) was analysed, when available.



## International Organisations

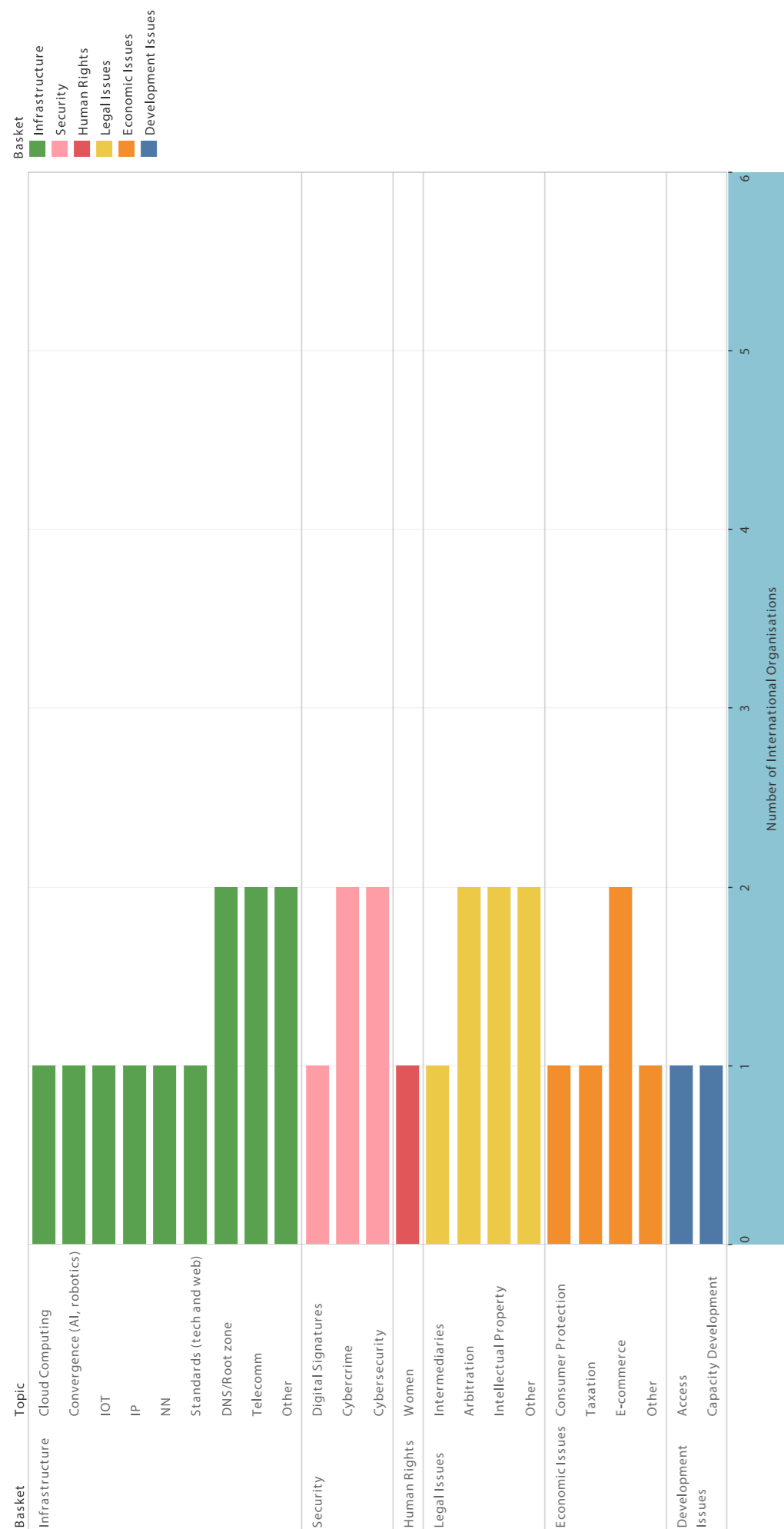


Chart 5: Coverage of IG baskets by the IG Schools

This certificate can be applied towards a Journalism Degree.

- **Software engineering.** The participant is expected to 'become a more versatile software engineer by strengthening techniques and understanding of high-level languages and systems programming'. To earn this certificate the student must complete four courses for graduate credit.<sup>30</sup> This certificate can be applied towards an Information Management Systems Degree.
- **Web technologies.** In this course, the student is expected to 'gain the technical tools and techniques necessary to build dynamic websites and applications'. To earn this degree the student must complete five certificate courses for graduate credit.<sup>31</sup> This certificate can be applied towards a Digital Media Design Degree or an Information Management Systems Degree.

**IG-related courses are increasingly becoming part of the curricula of undergraduate programmes.** Experts from the **Center for Technology and Society of the Rio de Janeiro Law School of Fundação Getulio Vargas**, for example, teach two obligatory courses and two elective ones on aspects related to technology and digital policies.<sup>32</sup> Likewise, the **Center for Internet and Society at Stanford Law School** offers courses on a credit and non-credit basis to undergraduate law students and other students throughout the university, on Internet policy issues ranging from privacy to telecommunications law and competition.

Even when there is no evidence that research centres have direct impact on the curricula of university trainings, **they serve as a hub for reflection and for the development of projects** that may foster the development of innovative thinking in the university realm and beyond. The Centre for Information Knowledge and National Development in Africa, which is part of the Faculty of Commerce of the **University of Cape Town (UCT)**, for example, is developing a project on extending the benefits of e-commerce with the aim of improving business in Africa and fostering the use of ICTs for development. The ICT4D Centre at the University of Cape Town functions as an academic hub for researchers focused on creating solutions that address socio-technical problems across Africa and in other developing regions.

Electives (any two courses from the select group). Track 2: Introduction to Computer Science Using Java I (required course); Introduction to Computer Science Using Java II (required course); Data Structures (required course); Elective (one course from select group).

<sup>30</sup> The four courses are: Principles of Software Engineering courses (any two courses from select group); Electives (any two courses from select group)

<sup>31</sup> Participants may choose any five courses from the Web Technologies certificate course group.

<sup>32</sup> The obligatory courses are: Law and technology and Intellectual rights (which places great emphasis on the digital impact on intellectual property protection). The two elective courses are: Trade, Law and Development in the Digital Economy and Regulation of Communication Technologies.

**Continuous education initiatives targeting professionals are being created by several academic institutions.** The **Nexa Center at the Politecnico di Torino**, for example, provides a face-to-face course targeting employees of public administrations on the topic of Open Data principles. Likewise, the **Center of Studies on Technology and Society of Universidad de San Andrés**, in Buenos Aires, and the Argentine Internet Trade Association (CABASE) have joined efforts to offer a blended intensive course of 52 hours (42 hours of face-to-face classes and 10 hours online) that grants a diploma in IG. The course aims to attract graduates and professionals that want to enhance their understanding of Internet policy issues. The centre also offers training on information and communication technology laws.

Universities are increasingly offering short courses of one or two weeks that present an overview of many issues related to digital policies, from infrastructure to cyber security and legal issues. Two examples are the Internet L@w Summer School, provided by the **University of Geneva** and the USC Annenberg Internet Diplomacy Summer institute, organised by the **University of Southern California (USC)**, School of Communication and Journalism.

### Capacity development provided through Coursera and other platforms

Coursera is an online platform initially created by university professors from Stanford that offers an extensive and diverse catalogue of courses, which can follow three different formats:

a) courses, consisting of recorded video lectures, auto-graded and peer-reviewed assignments, and community discussion forums. The course length is 4 to 6 weeks. Upon completion, participants receive a certificate of recognition in a format they can easily share online and post in their professional profiles, such as LinkedIn. The price range is USD 29 to USD 99 for taking the course and receiving a certificate;

b) specialisations, which are targeted at students who would like to master a specific career skill. The courses tackle hands-on projects based on real business challenges. The length of the course is 4 to 6 months. Upon completion, participants receive a specialisation certificate and the price range is USD 250 to USD 500;

c) university-recognised degrees in the areas of business, computer science, and data science. Upon completion, participants earn an accredited Master's degree provided by university partners. The price range is USD 15,000 to USD 125,000.

The selected sample includes 20 courses provided through Coursera which are of interest from an IG perspective.<sup>33</sup>

<sup>33</sup> The 20 courses included in our sample were: International Cyber Conflicts, State University of New York; Internet Giants: The Law and

Cybersecurity is the topic with the largest number of courses (6 courses), followed by the Internet of Things (5 courses). Short courses and specialisations predominate in the catalogue, and the latter format comprises several courses about a given topic. Some examples are: the specialisation on the Internet of Things, provided by the University of San Diego in partnership with Qualcomm; the specialisation on Cybersecurity: Developing a Program for Your Business, provided by the Kennesaw State University and the University System of Georgia; the specialisation on cybersecurity provided by the University of Maryland, and the specialisation on Cloud Computing provided by the University of Illinois.

Universities are the main providers of capacity building on Coursera, but other stakeholders, including companies, also make use of the platform to provide training. In terms of regional diversity, organisations located in North America make the most use of Coursera as a platform for providing capacity building in our sample (15 organisations), followed by Europe (6 organisations). Most of the courses are offered in English, but some of them offer subtitles in other languages, such as Chinese, Vietnamese, and Spanish.

Some universities have also developed their own online learning platforms to offer courses (usually in the MOOC format). This is the case of HarvardX, which provides course content materials for free or for a small fee (if the students choose to receive a verified certificate of completion). EdX, founded by Harvard University and MIT in 2012, is another example of a MOOC provider, run by a consortium of universities.

### Academic networks and student immersion

**Academic networks** are platforms that bring together academic institutions with different areas of expertise around common discussions or projects. The Network of Centres, for example, serves as a 'knowledge capacity development network, that focuses on building a common inter-disciplinary

body of knowledge and research amongst its members'.<sup>34</sup> Networks can exchange views on Internet policy developments, provide expert opinions, organise events and promote academic exchange programmes. All of these, albeit in different ways, contribute towards the capacity of individuals or groups to engage in the IG terrain, and in this way generally strengthen the IG discourse.

**Academic immersion** can take place in different formats, such as fellowships, internships and field work. Through accepting fellows and interns, many of the aforementioned academic institutions look to build a body of students interested in and with reasonable knowledge in their particular IG-related field. The Berkman Center at Harvard University, for example, opens an annual open call for fellowship applications and periodic calls for applications for specific thematic fellowships. The course provided by the Central European University also offers the opportunity to experiment with field work, with a 'hands on practicum' and 'two field trips within Budapest to meet with organisations engaged with work in [the] field'.

While there is no clear indication that university capacity development courses and post-graduation programmes present a consistent approach to fostering gender balance, the fellowships and internships have more flexibility to consider this criteria in the selection process. The Association of Pacific Rim Universities, for instance, seeks gender balance in its Asia Pacific Women in Leadership Programme.

### Content covered by academic institutions

Chart 2 shows the number of sampled academic institutions that cover the IG baskets and their subtopics (see chapter 1 for an explanation of the IG taxonomy).

The selected sample is focused on courses that deal with IG related issues and that combine technical and policy aspects. As a consequence, when it comes to the infrastructure basket, for example, university programmes that focus on telecommunications, computer science or programming from a purely technical standpoint were not included.

Technical discussions included in the **infrastructure basket** do not appear to be the primary focus of a number of the courses surveyed. Telecommunications are usually addressed from regulatory, competition, market liberalisation and policy-making standpoints. For example, the University of Strathclyde Glasgow offers an LLM in Internet Law & Policy and an LLM in IT & Telecommunications Law where the course structure and modules are identical. The exception in our sample is the Telecom programme of the University of Colorado, which tackles in-depth technical aspects and also offers a policy-oriented background.

<sup>34</sup> Network of Centers. About. Available at <https://networkofcenters.net/about>

such as the establishment of a Global Internet Governance Academic Network (GIGANET) and the launch of SIG. GIGANET was created in 2006 and the pilot of the European Summer School on Internet Governance (Euro-SSIG) took place in 2007.

Most SIG seem to function as an entry point for newcomers and also aim to broaden the knowledge of actors who have been professionally focused on specific IG areas and did not have the opportunity to be exposed to a zoomed-out approach to the IG ecosystem. APSIG accepts newcomers, but is oriented towards attracting individuals with previous knowledge in the IG field.<sup>60</sup> The schools allow the interaction among a mix of ages, seniority and stakeholder groups, which has been pointed out as one of the strengths of the model.<sup>61</sup>

The number of schools has multiplied in recent years, encompassing regional schools and national ones. For the purpose of this study, the regional schools Euro-SSIG, South-SIG, MEAC-SIG, AfriSIG and APSIG were thoroughly analysed, because they set a precedent for the creation of national schools.

The organisations formally responsible for organising the schools belong, in the majority of cases, to civil society. However, the technical community plays an important role in the development of most IG schools, which varies from being responsible for convening the school – MEAC-SIG is currently managed by ICANN – to being an important sponsor of the initiative – South-SIG and APSIG, for example, have been supported by ICANN and ISOC.

### Capacity development provided by SIG

Training by the schools is typically offered once a year. It usually consists of face-to-face activities over a period of four to five days. The size of the classes vary from small groups comprising an average of 25 students (EuroSSIG and APSIG), to larger groups which encompass an average of 200 students in South-SIG. The difference in size seems to influence the methodology. Smaller classes allow for more opportunity for discussion in break-out groups and role playing. Larger groups seem to favour lectures followed by questions and answers. Both cases present advantages: while smaller groups encourage more interaction, larger groups enhance inclusion and outreach.

Most of the training provided by the schools is conducted in English, with the exception of the South-SIG, which provides simultaneous translation into Spanish and, in some cases, into Portuguese. There is no consensual approach to

<sup>60</sup> Interview conducted with Pablo Hinojosa (APSIG) on 16 January 2017.

<sup>61</sup> Anriette Esterhuysen. IG capacity building that makes a difference. ITU Global ICT Capacity Building Symposium. 5 November 2016. <http://www.itu.int/en/ITU-D/Capacity-Building/Documents/CBS%202016/5%20AEsterhuysen.pdf>

translation: a school organiser<sup>62</sup> concluded that it could have a negative effect on the dynamics of interactive sessions, such as the break-out groups. It is possible that national IG schools provide a better opportunity to hold face-to-face discussions using local languages.

The selection process for the schools is competitive, but the criteria for selection is not always made clear, although it can be inferred, for example, that stakeholder diversity is sought by every school. The lack of clarity is particularly noticeable when it comes to gender balance. School organisers affirm that this criteria is taken into consideration<sup>63</sup>, and EuroSSIG goes as far as presenting statistics on gender, stakeholder, and regional diversity. However, gender is not mentioned in the call for applications put forth by the organisers of the Summer Schools. An explicit reference could provide an additional incentive for women to apply.

Schools do not charge for the course, with the exception of EuroSSIG, which also provides a reduced fee to Masters students. Some schools offer a limited number of fellowships covering partial or total costs with travel and per diems, and EuroSSIG offers fellowships to encourage the attendance of participants from developing countries, a measure that could strengthen global diversity, something that is deemed positive by some school organisers.<sup>64</sup>

Supporting material to the training is provided in online format by school organisers. It usually consists of a list of references of texts, and, sometimes, videos and slides, with which participants should get familiarised with prior to the course. In most cases, these materials are resources produced by several different organisations. The list of resources remains freely available online, but there is no clear approach to curation of the material and no way to be sure of how often the text material is updated. There is no general information about the licensing regime that would apply to the supporting material, so each resource would need to be separately examined in order to check if they provide information on copyright.

All IG schools issue certificates of completion for their training. They do not seem to follow any particular accreditation standard. The added value of the certificate for the participants needs to be further investigated, but a possible explanation is that by mentioning the certificate in their curricula, students expect to demonstrate knowledge in the field, by showing their engagement on a programme belonging to the increasingly recognised 'SIG' label.

Some schools offer follow-up opportunities to the most deserving participants for engagement in the IG field, such

<sup>62</sup> Ibidem.

<sup>63</sup> Interviews with Olga Cavalli (South-SIG), Pablo Hinojosa (APSIG), and Fahd Batayneh (MEAC-SIG) confirm this trend.

<sup>64</sup> Anriette Esterhuysen (AfriSIG). IG capacity building that makes a difference. ITU Global ICT Capacity Building Symposium. 5 November 2016. Interview with Olga Cavalli (South-SIG).

Table 5: Summary of sampled international organisations offering capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
ITU Academy	Infrastructure Security	Range of training activities and knowledge resources	Blended	Policy makers, telecommunications/ICT business managers and practitioners, government officials from Ministries of ICT and regulatory authorities, diplomats and representatives, and university students and teachers
International Labour Organisation	Infrastructure	LLM Degrees	Blended	Graduates, professionals and junior academics
WIPO Academy	Infrastructure Legal issues	Training, MA Degrees, distance learning, summer schools	Online and face-to-face (depending on initiative)	Trademark officials, trademark examiners; beginners and young professionals who want to understand the basics of IP; legal practitioners, professionals in copyright offices and collective management organizations, broadcasting organizations or publishing industries, academics and university students
Commonwealth Secretariat	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	Workshops on legal frameworks for ICTs	Face-to-face	Government officials and professionals holding senior/ middle management positions related to ICT/telecoms regulation from legal policy as well as operational departments.
Commonwealth Telecommunications Organisation	Infrastructure Legal issues Economic issues Development issues	Courses	Face-to-face	Members and non-members
UN Office on Drugs and Crime (UNODC)	Security Human rights	Global e-Learning Programme	Online	Officials of Member States, International Organizations, and other UN agencies and UNODC partners

## Schools on Internet governance

### General Overview

Schools on Internet governance are increasingly important in the capacity development landscape. Their creation can

be traced back to the conclusions of the UN Working Group on Internet Governance (WGIG), which recognised a lack of academic research and teaching on Internet governance at that time. Academic members of the WGIG contributed to the organisation of an expert meeting in Rathen (Germany), in June 2006, which produced a number of recommendations,

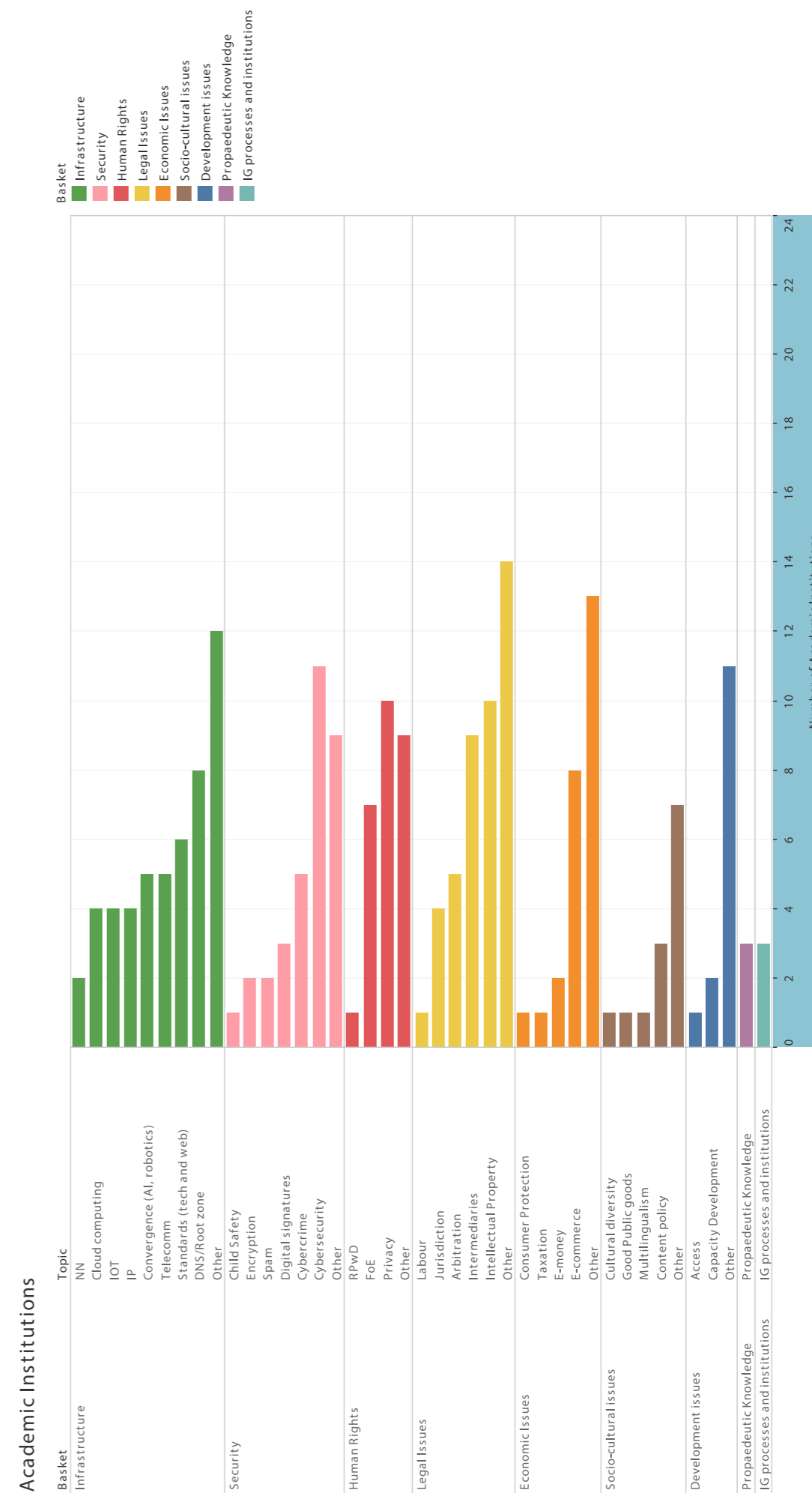


Chart 2: Coverage of IG baskets by the sampled academic institutions

The governance of DNS, IP numbers and of standards and protocols are introduced in academic circles as examples of multistakeholder collaboration in policy-development for these resources. The University of Colorado, however, deals with this topic from a technical perspective, preparing students to be professionals in the fields of telecommunications and network management. The University Sains Malaysia also offers a strong technical approach with its course on advanced computer networks.

Some courses, such as data management and journalism, also started to introduce notions of programming and web development. A considerable number of universities in our sample deal with different aspects of big data. Some consider big data to be an enabler of other emerging technologies, such as IoT and AI. IoT has increasingly been introduced in curricula, while AI is just starting to be considered in academic IG-related capacity development.

Most of the universities in our sample deal with **cybersecurity**, especially in non-degree courses. Although according to some interviewees practical experience in cybersecurity is probably the most valuable asset for professionals wishing to work in this area, they also recognised that contractors in the private and the public sectors are increasingly seeking professionals with certification, and universities are trying to fill the gap.

Cybercrime and legal aspects are part of the curricula of many universities, such as Harvard University and the National Law University of Jodhpur. Digital forensics, a topic based on the interplay between cybersecurity and legal issues, is increasingly offered. The need to balance security and privacy is a recurrent topic, and courses offered by some universities, such as Harvard and Stanford, also touch upon surveillance and intelligence gathering. In spite of that, the discussion of this tension seems to be less present in non-degree courses targeted at professionals than in degree courses.

The programmes which are the result of partnerships between universities and the public sector seem more prone to analyse cybersecurity from a national security/defence standpoint. An online course on international cyber conflicts and warfare, provided by the State University of New York, is offered on Coursera. Unique to this course is its psychological perspective, with an emphasis on trust, diplomacy and motivation. The issue of diplomacy is also touched on by the Link Centre and DiploFoundation programmes.

While the course offered by the Central European University is also heavily weighted towards security issues, it has a strong human rights lens to its discussions. In line with this – and given its target audience<sup>35</sup> – its discussions involve tools for digital security and privacy.

Most of the universities in our sample include **human rights** in their capacity development, either as a main topic or as a transversal concern. The right to privacy is the overwhelming focus of human rights-related discussions, followed by the right to freedom of expression. Several courses adopt a general approach, making an overview of key human rights issues related to IG and presenting initiatives to develop 'bills of rights' and principles for the online environment. The American University touches upon the rights of people with disabilities online. There does not seem to be a particular focus on gender issues among the universities included in our sample.

**Legal issues** are part of the majority of programmes, with special emphasis on intellectual property, with the tension between copyright and trademark protection online on the one hand, and access to knowledge, on the other. Special attention is also given to topics related to Internet intermediaries and liability. The legal analysis of topics related to security, such as cybercrime law and digital forensics is increasingly part of the curricula.

Unlike other stakeholder groups included in this mapping exercise, academic institutions place special emphasis on **economic issues**. They approach the topic from multiple angles. While several institutions deal with the changes introduced by the digital economy from a more general standpoint, others place emphasis on specific topics. E-commerce is a prominent theme at the Link Centre, the National Law University of Jodhpur and the Alexander von Humboldt Institute for Internet and Society at the University of Berlin. Some institutions, such as the University of Hong Kong, also deal with the enabling environment that makes online commerce flourish, such as e-payments, mobile money and FinTechs. The American University provides capacity on the online game industry.

Coverage of **traditional socio-cultural issues** such as content diversity and multilingualism are not prominent within the sample of institutions researched. They adopt more innovative approaches to this basket, such as how big data can contribute to media production and journalism and the use of online media by social movements and activists. Some programmes tackle content policy, such as blocking and filtering.

Most of the academic capacity development tackles **development issues** from the standpoint of the use of technology to strengthen democracy. Several courses deal with e-government, open data and citizen participation online. The use of ICTs for development is emphasised in courses offered by UC Berkeley, the University of San Andres and the University of Cape Town. The Link Centre covers cultural

and human rights activists working in policy advocacy organisations, NGOs, media development agencies; as well as policy-makers, activists, academics (including PhD students and advanced MA students), journalists or other media practitioners with demonstrated interest in communication policy change.'

issues and challenges in the context of the Internet, the Academy's summer school also considers Internet domain names and dispute resolution.

### The Commonwealth Telecommunications Organisation (CTO)

The CTO offers a range of courses to members and non-members, including member countries, affiliated member countries, ICT sector members and academic members. It also runs a Programme for Development and Training which 'provides specialised ICT capacity development training programmes to ministries, regulatory agencies and ICT operators around the world, to help support the growing demands and challenges they face.'<sup>56</sup> Its courses offered fall into three categories: Business Development and Management, Policy and Regulation, and Technology. In terms of this mapping, the Policy and Regulation category is of importance. It is clustered into 11 subjects, covering areas such as consumer protection, licensing and convergence, access costs and tariffs, spectrum pricing, quality of service, and competition and regulation. It has a strong emphasis on the interplay between economics and regulatory issues.

Courses are delivered around the world in commonwealth countries. They are charged for and scale between approximately GBP 750-1500, with discounts given to CTO members. The specific target audience for each course differs depending on the course offered. For example, its course on spectrum pricing targets 'telecommunications engineers, economists, spectrum management practitioners and other telecommunications professionals with an interest in licensing and spectrum pricing',<sup>57</sup> while its course on licensing in a converged environment targets 'operators and regulators who need to understand licensing issues related to convergence, and particularly business managers who need an overview of current licensing regimes in a converged environment.'<sup>58</sup> The CTO offers fellowships and runs an alumni programme.

### The International Trade Centre (ITC)

ITC is a joint agency of the World Trade Organization and the United Nations, aiming to foster inclusive and sustainable economic development, and contribute to achieving the United Nations Global Goals for Sustainable Development. It is dedicated to supporting the internationalisation of small and medium-sized enterprises (SMEs) in developing and transitional economies, enabling them to become more competitive and connect to international markets for trade and investment.

<sup>56</sup> <http://www.cto.int/training/programme-for-development-and-training/>

<sup>57</sup> <http://www.cto.int/training/course-catalogue/policy-and-regulation/spectrum-pricing-po256/>

<sup>58</sup> <http://www.cto.int/training/course-catalogue/policy-and-regulation/licensing-in-a-converged-environment-po107/>

The ITC provides some courses of interest to this mapping, particularly related to the economic basket, such as 'E-commerce for SMEs: an introduction to policymakers', offered in partnership with DiploFoundation and 'Embarking on a lean digital transformation for organisations'. Other courses touch upon issues related to creating an enabling trade environment online and offline, indirectly impacting on topics encompassed in the economic basket. Course materials are provided in English and some courses in the catalogue have been translated into French, Spanish and Arabic. The participants work through course materials as a group and they are assisted by facilitators. Certificates are offered in the format of an automated certificate issued for self-study, or a more substantial recognition issued for the completion of certificate programmes.

### International Labour Association (ILO)

Through its Turin School of Development, a partnership between the International Labour Organisation's (ILO) training centre, the University of Turin, the Polytechnic and other academic institutions and specialist multilateral organisations, the ILO offers MA programmes through blended learning. While English is the predominant language, some of the MA courses are offered in French and Spanish.

Two are of particular relevance to this study: LL.M in International Trade Law – Contracts and Dispute Resolution, which has a module on e-commerce, and the LL.M in Intellectual Property, which 'aims to provide an in-depth examination of the classical topics of IP law, as well as a specialised analysis of the latest developments in the fields of patents, trademarks, domain names, copyright and related rights, design, software and databases, integrated circuits, biotechnological patents and plant varieties, the Internet and e-commerce'.<sup>59</sup> Both are offered in blended learning formats, with the LL.M in International Trade Law a one year degree, and the LL.M in IP 38 weeks.

Chart 4 shows the number of sampled initiatives from international organisations that cover the IG baskets and their subtopics (see chapter 1 for an explanation on the IG taxonomy).

<sup>59</sup> <http://www.itcilo.org/medias/pdf/catalog/training-catalogue-light>

### International Organisations

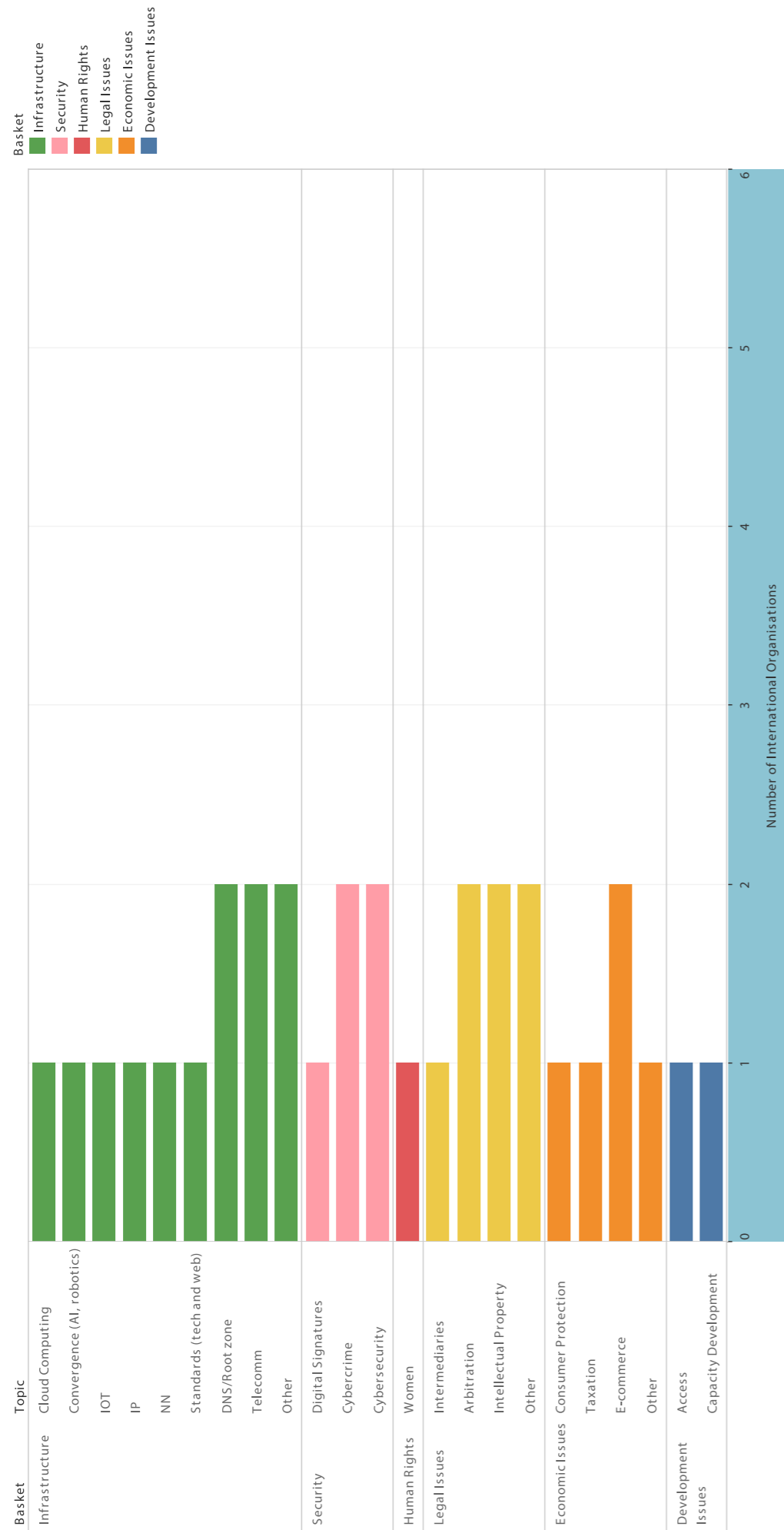


Chart 4: cover of IG baskets by the sampled international organisations

Table 2: summary of sampled academic institutions offering capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
University of Oslo	Infrastructure Legal issues Development issues IG processes and institutions	MA-level university course	Face-to-face	MA-level students
Central European University	Security Human rights Legal issues Socio-cultural issues	University course	Face-to-face	The course is intended for communication, human rights, or technology professionals, policy advocates, media lawyers, technologists and human rights activists, NGOs, media development agencies; academics (including PhD student and advanced MA students), journalists or other media practitioners.
University of Helsinki	Infrastructure Human rights Legal issues Introductory Knowledge IG processes and institutions	MA-level university course	Face-to-face	MA-level students
Alexander von Humboldt Institute for Internet and Society, University of Berlin	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues	Doctorate programme	Face-to-face	International early-stage researchers
Politecnico di Torino - Nexa Center	Infrastructure Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge	Undergraduate courses Doctorate programme Specific courses	Face-to-face	Undergraduate students Graduate students Specific audiences, ex: members of the public administration
Oxford Internet Institute	Infrastructure Legal issues Socio-cultural issues	MSc in Social Science of the Internet	Face-to-face	Students, professionals working in internet fields, government policy-makers
University of Stathclyde Glasgow	Infrastructure Security Human rights Legal issues Economic issues	LLM Degree	Blended	Students
Joint International Doctoral (Ph.D.) Degree in Law, Science and Technology	Infrastructure Security Human rights Legal issues Economic issues Development issues	Doctorate programme	Face-to-face	Students with a masters degree
University Sains Malaysia	Infrastructure Security Legal issues Development issues IG processes and institutions	Master of Science (Advanced Computer Networks)	Face-to-face	MA-level students
University of Hong Kong - Faculty of engineering, Law & Technology Centre of University of Hong Kong	Infrastructure Security Human rights Legal issues Economic issues	LLM Programme in Information Technology and Intellectual Property Law	Face-to-face	MA-level students
Centre for Communication Governance at National Law University, Delhi	Human rights Legal issues Economic issues	Specific courses	Face-to-face Online	All interested participants

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
DiploFoundation/ University of Malta	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	Postgraduate Diploma and Master's degree in Contemporary Diplomacy	Blended	Post-graduate students and practitioners
National Law University - Jodhpur	Infrastructure Security Legal issues Economic issues	University course on Cyberlaw and Cybersecurity	Face-to-face	Law students
Association of Pacific Rim Universities	Economic issues	Digital Economy Initiative	Face-to-face	International organisations, government and business
NetMission.Asia	IG processes and institutions	Network of volunteers as capacity building	Training materials online	Top students from Hong Kong universities.
Harvard University -	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues	Undergraduate and graduate courses, and continuous education. Fellowships	Face-to-face Online Blended	Undergraduate students MA-level students PhD students Professionals Individuals interested in lifelong learning
MIT - Center for Civic Media	Infrastructure Human rights Socio-cultural issues	Undergraduate and graduate courses, and continuous education	Face-to-face	Undergraduate and graduate students, public administration employees
University of Geneva	Infrastructure Security Economic issues Legal Issues Human Rights Socio-cultural issues	Summer course	Face-to-face	Interested participants
University of Southern California (USC)	Infrastructure Security Economic issues Legal Issues Human Rights Socio-cultural issues	Summer course provided by the USC Annenberg Internet Diplomacy Summer institute	Face-to-face	Interested participants
Georgia Institute of Technology	Infrastructure Security Human rights	Undergraduate and graduate courses	Face-to-face	MA-level students PhD students
American University, Washington DC	Infrastructure Security Human rights Economic issues Socio-cultural issues Development issues	Undergraduate and graduate courses	Face-to-face	MA-level students PhD students
Stanford University - Center for Internet and Society at Stanford Law School	Infrastructure Security Human rights Legal issues	Undergraduate and graduate courses	Face-to-face	Undergraduate students MA-level students PhD students
University of Colorado-Boulder	Infrastructure Security Legal issues	PhD in Telecom, Master's of Science in Telecom, continuous education	Online or Face-to-face, with the exception of the PhD programme, which can only be taken face-to-face	MA-level students PhD students Professionals Individuals interested in lifelong learning
UC Berkeley	Infrastructure Human rights Legal issues Economic issues Development issues	Undergraduate and graduate courses	Face-to-face	MA-level students (especially geared towards developing skills for the job market) PhD students Professionals Individuals interested in lifelong learning

a given subject, namely: Spectrum Management Training Programme, Quality of Service Training Programme, the ICT and Climate Change Training Programme and the Online Master of Communication Management, this latter in partnership with the United Kingdom Telecommunications Academy (UKTA) and the University of Rwanda. The materials for these courses are developed by experts drawn from within and outside the ITU.

The modules of the Master's programme can lead to different types of certification. Upon completion of 60 credits (or 2 modules), the student is awarded a post-graduate certificate, and after 120 credits (or 4 modules), a post-graduate diploma is granted. The awarding of a Master's degree depends on the writing of a dissertation. This flexibility enables students to take specific modules for their continuous professional development, which can also contribute towards obtaining an academic award. This approach is similar to the combination of degree and non-degree certificates being adopted by universities (see previous section on the capacity building initiatives provided by the academic sector).

Although the copyright regime related to content on the website is made clear - reproduction can be done with permission - there is no distinguishable information on the licensing regime related to course materials.

In terms of a **methodological approach**, courses are delivered online through the ITU Academy platform, face-to-face with regional partner institutions and in the format of blended training, which combines classroom studies with online activities and self-studies. The ITU Academy Platform User's Manual provides detailed practical information to coordinators and instructors of courses and to the general public wishing to enroll in training. While some courses are offered free of charge, most of the catalogue is offered on a paid basis and prices vary from USD 150 to USD 900.

The **target audience** of ITU's capacity building initiatives is varied, comprising general programmes for government policymakers and regulators, professional business-focused curricula for senior ICT executives and managers, to specialised programmes for technical and operational staff and accredited academic programmes. Some courses in the catalogue are targeted at particular regions, such as the course on 'Digital Archiving for Arab States' or the course on 'ITU Asia-Pacific CoE Training on Conformity and Interoperability for 4G LTE'. Courses are also translated into non-English languages, such as Spanish and French. The regional approach and translation efforts suggest that **the content of the course is adjusted to regional needs**.

### The World Intellectual Property Organisation (WIPO)

The **WIPO Academy** offers a wide range of courses tailored to different target audiences and different skills levels. It

includes a professional development programme targeted at diplomats and government officials such as trademark officials and examiners, an MA programme in partnership with universities and a distance learning programme for 'beginners and professionals who want to understand the basics of intellectual property' and -- for advanced courses - legal practitioners, managers in copyright offices and staff in collective management organisations, broadcasting organisations or publishing industries, academics and university students with a prior knowledge of intellectual property. It also runs summer schools in different countries<sup>53</sup> targeted at 'senior and graduate students from any academic discipline' as well as young working professionals.

A number of the courses are relevant to regional concerns, such as the 'WIPO-OEPM Training Course on Trademark Procedures for Latin American Countries' or the 'Specialised Training Course on Trademarks for Caribbean Countries'. Beginner distance learning courses are offered for free, while advanced courses are charged for on a sliding scale from USD 40 to USD 200, depending on one's status (student, professional, academic, or government official) and country of origin (developing country, country in transition or developed country). Government officials from developing countries or countries in transition study advanced distance learning courses for free.<sup>54</sup>

Courses are also designed to offer a phased introduction to the different intellectual property issues, and a number of advanced courses require the completion of feeder courses offered by the academy to participate. The distance learning programme includes self-paced beginner courses, advanced courses with a facilitator or tutor, and a mix of online and face-to-face training. Participation in the summer school requires completion of a distance learning module.

Of the courses offered in its 2017 portfolio, 10 make a reference to the Internet (5 in the professional development programme and 5 in the distance learning courses). These deal with trademarks and copyright and the Internet, while one professional development course (WIPO-BCC Advanced Training Course on Copyright and Related Rights Issues and Challenges for Senior Officers) lists the following module outline: 'Brave new world: current national, international and regional issues in the context of the Internet, including user-generated content'.<sup>55</sup> While also considering trademark

<sup>53</sup> Such as Chile, China, India, Mexico, Russia, Spain, Tunisia and South Africa.

<sup>54</sup> For the professional development courses travel and subsistence expenses are covered by the WIPO or government or partner organisation offering the training course. Participants get subsistence allowance. Registration fees for summer schools range from USD 250-700, depending on whether one is a student or a young professional from a developing country or country in transition or industrialised country. Summer school participants are responsible for their own accommodation and living expenses.

<sup>55</sup> WIPO Academy. Professional Development Programme. Available at <https://welc.wipo.int/acc/index.jsf?page=pdpCatalog.xhtml&lang=fr&cc=WIPO-BCC>

Table 4: Summary of sampled private sector organisations offering capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
GSMA	Infrastructure Security Human rights Economic issues Socio-cultural issues Development issues	Courses	Online and face-to-face	Policy-makers and regulators
Cisco Systems	Infrastructure Security	Courses Networking Academy Certification	Online	Professional certifications that cater to students with different needs
Intel Corporation	Infrastructure Security	Training on cybersecurity and digital infrastructure policy	Face-to-face	Not specified
US Tele-communications Training Institute (USTTI) in partnership with private sector (e.g. GSMA, Intel, Cisco, Packet Clearing House)	Infrastructure Security Human rights Economic issues Development issues	Training in tele-communications regulation, security, IG policy issues in general	Face-to-face	Government and regulators, policy makers, executives and managers, public and private sector attorneys
Microsoft	Infrastructure Security Development issues	Courses Microsoft Academy Afrika Academy Interns4Afrika	Online Face-to-face Internships	Developers, IT experts, data experts and students; Government regulators and representatives of intergovernmental organizations; Higher education graduates in Africa, government leaders and the Microsoft partner community
AT&T	Infrastructure Security Legal issues	Training on cybersecurity and networks	Face-to-face	Senior policy-makers
CompTIA, CISCO, CREST, EC-Council, ISACA, ISC2, and SANS, etc.	Security Infrastructure	Certification	Driving the standardisation of knowledge through the reputation of their certification	
Independent bodies that develop a harmonised set of standards across the industry (e.g. Cloud Credential Council (CCC))	Infrastructure	Certification	Provision of certification standards	Companies are part of the network of accredited courseware providers, which offer preparatory courses.

mechanism for coordination of multistakeholder implementation activities, creation of knowledge and sharing of best practices.

When it comes to the provision of capacity building, the organisation created the **'ITU Academy'**, in 2012, to serve as a one-stop-shop for training activities and knowledge resources in ICTs. Courses are delivered by means of a partnership with various training providers including the ITU's Centres of Excellence (CoEs)<sup>50</sup>, Internet Training Centres (ITCs)<sup>51</sup> as well as academic institutions and the private sector.

<sup>50</sup> Centres of Excellence (CoEs) have been created with the purpose to share expertise, resources and capacity-development know how in telecommunication and ICT training around the world. CoE networks have been established in a number of regions including Africa, the Americas, Arab States, Asia-Pacific, Caribbean, Commonwealth of Independent States (CIS) and Europe.

<sup>51</sup> The ITU Internet Training Centres initiative is a targeted capacity building programme that works towards the creation and enhancement of

Most of the IG baskets are to some extent touched upon by courses offered by the ITU Academy<sup>52</sup>, with a focus on the policy trends identified under Infrastructure in chapter 1, such as: the deployment of 5G networks, legal and regulatory barriers for the introduction of cloud services, TICs infrastructure for the IoT and regulatory and policy approaches for convergence.

The ITU also develops training programmes, comprised of several modules covering a full range of topics under

ICT and related skills. Through a train-the-trainer approach, the ITU Telecommunication Development Bureau works with public and private-sector partners and training institutions and universities to set up Internet Training Centres which provide access to affordable and relevant training programs using both face-to-face and distance-based training methods.

<sup>52</sup> The courses provided through the ITU Academy are clustered in the following areas: Technologies and Services; Policy and regulation; Business and Management; Spectrum Management; ITU-T courses; trainings provided to indigenous communities and a professional Master's degree offered for participants of the African region.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
Universidad de San Andrés - Center of studies on technology and society	Security Human rights Legal issues Economic issues Development issues Propaedeutic knowledge	Intensive courses	Blended	MA-level students PhD students Professionals Individuals interested in lifelong learning
Fundação Getulio Vargas - Center for Technology and Society	Infrastructure Security Legal issues Economic issues Development issues	Undergraduate courses Summer courses	Face-to-face	Undergraduate students
University of Cape Town - IP unit	Legal issues Economic issues Development issues	LLM Programme	Face-to-face Online	MA-level students
Link Centre, University of Witwatersrand	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues	Internet Governance in Africa (IGiA) - courses	Blended	African players in the internet ecosystem*, public, private and civil society sector; graduate and undergraduate students

diversity and access as a developmental concern, while the Oxford Internet Institute considers the social impact of the Internet. It can be assumed that the University of Oslo touches on access issues and the digital divide given its interest in WSIS.

On the undergraduate level, multidisciplinary courses on legal, economic and policy aspects of the digital revolution are frequently offered as introductory capacity development to first-year **students** as a way to make them reflect on the changes that technology brings to their future professional fields. These courses are usually taught by experts attached to research centres. Some examples are the course on the 'digital revolution' offered as an elective discipline by professors of the Nexa Center at Politecnico di Torino (Italy) to engineers and architects, and the course on law and technology, offered as an obligatory discipline by the Getulio Vargas Foundation, in Rio de Janeiro, to law students in the first semester. Elective courses are usually opened to students from different faculties. They offered specialised knowledge about certain topics, such as telecommunication law and policy, intermediary liability, encryption and digital innovation.

## Civil society initiatives

### Overview

The mapping of civil society capacity development initiatives poses some challenges. While some civil society organisations, such as **DiploFoundation**, the **Geneva Internet Platform**, **Global Partners Digital**,<sup>36</sup> and the **Association for Progressive Communications (APC)** have a consistent interest in both IG and capacity development, numerous

<sup>36</sup> Although Global Partners Digital defines itself as a socially-orientated 'company', it frequently operates as a civil society organisation.

organisations also show an interest on occasion. In general, it is possible to say that many, if not most, civil society organisations do some form of capacity development – be it through ad hoc workshops or other forms of engagement – but these are often needs-based, and are beyond the remit of this research.<sup>37</sup>

Civil society is a 'broad term'. As our sample of civil society initiatives suggests, IG capacity development is offered by donors, foundations, think-tanks and activist NGOs, for example. The nature of capacity development among civil society is also not settled – some run IG schools in partnership with other organisations, some develop training materials for third parties, others hold workshops, while others yet build knowledge and capacity through networks. Most of the capacity development initiatives are inclusive, but they can also be targeted at a specific community, such as the work of the **International Federation of Library Associations and Institutions (IFLA)**.<sup>38</sup>

Of the civil society initiatives mapped here, DiploFoundation shows substantial engagement in capacity development, given its core mission. It also forms partnerships across sectors to deliver its courses, including donors (Hivos), the private sector (GMSA), and universities (the University of Malta for a Master's level degree – see university-led initiatives). The training aspects of its capacity development are delivered using different teaching methodologies, with courses offered online, blended, and face-to-face.

<sup>37</sup> Other organisations whose capacity development work is worth considering in this context but have not been captured in this mapping include: Privacy International, It-for-Change, Jinbonet, Fantsuam Foundation, KICTANet, Women'sNet, Women of Uganda Network, CIPESA, Digital Empowerment Foundation, Foundation for Media Alternatives, Thai Netizen Network, One World Platform, Metamorphosis Foundation, Blue Link, Pangea, Nodo Tau, Nupef, Derechos Digitales, Sula Batsu, and Eslared. Also see the work of the Centre for Internet Society mapped in this report.

<sup>38</sup> <http://www.ifla.org/>

The **APC** also works across several spaces simultaneously, frequently in partnership with other NGOs, institutions, donors, consultants and governments (see, for instance, its work on AfriSIG). The APC focuses on two areas: building leadership capacity in Africa through the annual African School on IG, which has participants including senior government officials, young academics, developers and civil society activists (see the section on IG schools) and building capacity among women and gender experts/activists through the Gender in IG exchanges. The APC also conducts capacity building with regulators on particular topics, such as infrastructure sharing, fibre connectivity, open access networks, TV white spaces and community networks.

Its online training modules have all been developed in partnership with experts in the field, and as part of the Catalysing ICTs in Africa Project.

**Global Partners Digital** launched a two-year programme in January 2016 aimed at '[building] the capacity of civil society actors in the global South to effectively engage in cyber policy debates at the national, regional, and international level' and '[piloting] frameworks for national multistakeholder involvement in policy and decision-making processes on cybersecurity.' Its cyber policy training programme, which is part of this initiative, is offered in blended format to civil society participants from Asia, Africa, Latin America and the Caribbean.<sup>39</sup>

Among donors, **Hivos** shows a strong interest in IG capacity development, particularly in the MENA region where it collaborates with DiploFoundation on online training programmes. While face-to-face capacity development is offered by the **Geneva Centre for Security Policy (GCSP)**, **Best Bits** and **Open Knowledge International** build capacity specifically to strengthen civil society engagement in IG through a network.

The target audiences for the civil society initiatives vary. They do, however, appear to fall into two broad camps: first, capacity development that looks to strengthen the knowledge and skills-base of civil society activists and organisations, and thereby increase the influence of those organisations in policy spaces, and second, initiatives that look to build capacity among policy-makers and regulators and, to a lesser extent, the private sector.

Capacity development initiatives that seek to build the expertise of civil society itself are offered in one way or another by all of the civil society initiatives mapped here, most prominently by the APC, Hivos, and Best Bits (in the case of the APC, its target audience overlaps into the second category).

Not all of the initiatives that fall into the second category – targeting policy-makers and regulators – present

multistakeholder approaches. While the APC's AfriSIG has a multistakeholder agenda, and the GCSP targets mid-career professionals from different sectors in one of its courses, DiploFoundation targets government officials, diplomats, policy-makers, civil society, and IG practitioners in most of its courses. The GCSP is unique in targeting military cybersecurity experts in its course on developing a cybersecurity strategy.

In addition, every year the GIP provides a just-in-time course called 'Introduction to Internet Governance' for diplomats and other actors in International Geneva. The course is delivered through blended learning combining online activities and face-to-face lunch meetings every Monday. The just-in-time aspect is related to the adjustment of the course curriculum to policy dynamics that participants follow (e.g. if online human rights are addressed in the UN Human Rights Council, participants cover this subject in the course).

### About the capacity development provided by civil society

The courses offered by civil society are a mix of free and paid-for courses, depending on whether the development and delivery of the course is donor-funded, but also on the sustainability needs of the course offered. For example, the APC's online training materials are free, and published under creative commons licensing, but there is no on-going cost incurred by the organisation, which simply makes the materials available for others to use. Fees, ranging from CHF 1000 to over CHF 10,000, depending on the nature of the course offered, are charged by DiploFoundation and the GCSP. DiploFoundation, however, does not charge for some of its courses, while Hivos funds participation in the MENA region.

In general, the development of networks through learning together appears to be an important aim of civil society initiatives. Class sizes average around 25,<sup>40</sup> and, besides the Best Bits initiative, where networking-building is a priority, DiploFoundation, Hivos and the APC (through AfriSIG) have the specific aim of keeping participants in contact with each other. Fellowships and support are offered by DiploFoundation, the GIP, Hivos, and the GCSP.

The Internet is used to deliver courses by both DiploFoundation and the APC, while both Global Partners Digital and the GIP adopt a blended learning approach, using the Internet for online interaction, and face-to-face meetings for current discussions.

As mentioned, the APC makes its training modules available online for others to use, while DiploFoundation uses its own learning management system to offer an interactive collaborative space for learning. Of interest, Best Bits also uses

virtualisation. The course enables participants to successfully complete the associated Virtualization Essentials exam<sup>48</sup>, a vendor-specific certification offered by the CCC.

**Partnerships between the private sector and other stakeholder groups are increasingly relevant in capacity development.** The United States Telecommunications Training Institute (**USTTI**) collaborates with several private companies to provide training sessions. Seventeen courses related to cybersecurity are being offered, for example. They focus on a plurality of topics, including 'cybersecurity and global digital infrastructure policy', offered with **Intel**, 'Principles of mobile privacy' and 'Children and Mobile technology', both offered with **GSMA**, and Communications Infrastructure Economics and Regulation, offered with **Packet Clearing House**. A course on Internet policy-making in the multistakeholder environment is offered with the **National Telecommunications and Information Administration (NTIA)**.

Cybersecurity is an area in which the private sector is considerably involved in capacity development as providers of training and certification. The initiatives under this thematic basket will therefore be more thoroughly analysed.

**Due to the recent emergence and rapid expansion and evolution of cybersecurity professions, some private sector actors are playing a key role in providing training and certification**, such as CompTIA, CISCO, CREST, EC-Council, ISACA, ISC2, and SANS. These companies can be seen as driving the standardisation of knowledge through the reputation of their certification. In many cases, private sector companies are already demanding that their cybersecurity specialists hold a specific certificate from one of these providers. One of the advantages of recognising and working with these bodies is that their hands-on knowledge transfer allows for rapid labour qualification. This is very strong in the USA where most of the major private cybersecurity certificate providers are based.

**Companies are also investing in joint ventures, research hubs and start-up incubators in partnership with universities and national and local authorities.** Many of the larger research labs have partnered with multinational companies ranging from network technology providers such as Intel and CISCO, to general information and communication technology (ICT) companies such as Microsoft, or telecommunication providers such as Deutsche Telekom, and in some cases even defence industries such as Airbus Group SE. This approach combines governmental support with the hands-on experience and the financial potential of the corporate sector as well as the knowledge and research potential of the universities. Such partnerships provide funds and conditions to enhance the academic portfolio,

<sup>48</sup> The exam consists of 40 questions and has a 60 minute time limit. It is typically taken at the end of a training course that is delivered by a Certified Training Partner. It is also available through professional testing centres worldwide.

develop cutting-edge and applied solutions to technology, and increase the global competitiveness of the region and the country in cybersecurity markets.

Some countries are particularly concerned with the provision of training on cybersecurity to small and medium size enterprises, which represent the largest number of businesses, but may not have the resources to adequately train their employees, update their infrastructure, or have their own incident response team. The Federal Ministry for Economic Affairs and Energy of Germany, for example, organises trainings for SMEs provided by the Association of German Chambers of Commerce and Industry.

Even when there is no formal partnership established with academic centres, **the private sector also indirectly influences the courses that are being offered by the academic sector**, especially those that are dedicated to preparing students for the job market. The skillset that the private sector values inspires the development of curricula.

Chart 3 shows the number of sampled private sector initiatives that cover the IG baskets and their subtopics (see chapter 1 for an explanation on the IG taxonomy).

## International organisations

The selected sample of international organisations included in this study encompasses: a) the international organisations that are WSIS action line facilitators and co-facilitators<sup>49</sup>; b) other international organisations that develop capacity development in IG-related issue, identified by means of interview and desk research.

### The International Telecommunication Union (ITU)

The ITU plays a varied role in capacity development in the IG field. The initiatives carried out by the organisation include, among others: a) offering platforms for multistakeholder discussion and knowledge-sharing; b) providing capacity building with the support of trusted partners.

The ITU serves as a facilitator or co-facilitator in several action lines comprised in the Geneva Plan of Action, including on the implementation of line C4, dedicated to capacity building. It also co-organises the World Summit on the Information Society Forum with UNESCO, the UNDP and UNCTAD. The WSIS Forum is the largest annual gathering of the 'ICT for development' community and offers a space where capacity building takes place, by functioning as a

<sup>49</sup> The Tunis Agenda for the Information Society, adopted in 2005 as an outcome of the second phase of the World Summit on the Information Society (WSIS) states that the WSIS implementation mechanism at the international level should be organised taking into account the themes and action lines in the Geneva Plan of Action, adopted at the end of the first phase of WSIS, in 2003, and moderated or facilitated by UN agencies when appropriate.

<sup>39</sup> It includes online training using videos and interactive Q&As, followed by expert-led in-person training.

<sup>40</sup> Although Global Partners Digital has 50 participants in its cyber policy training programme.



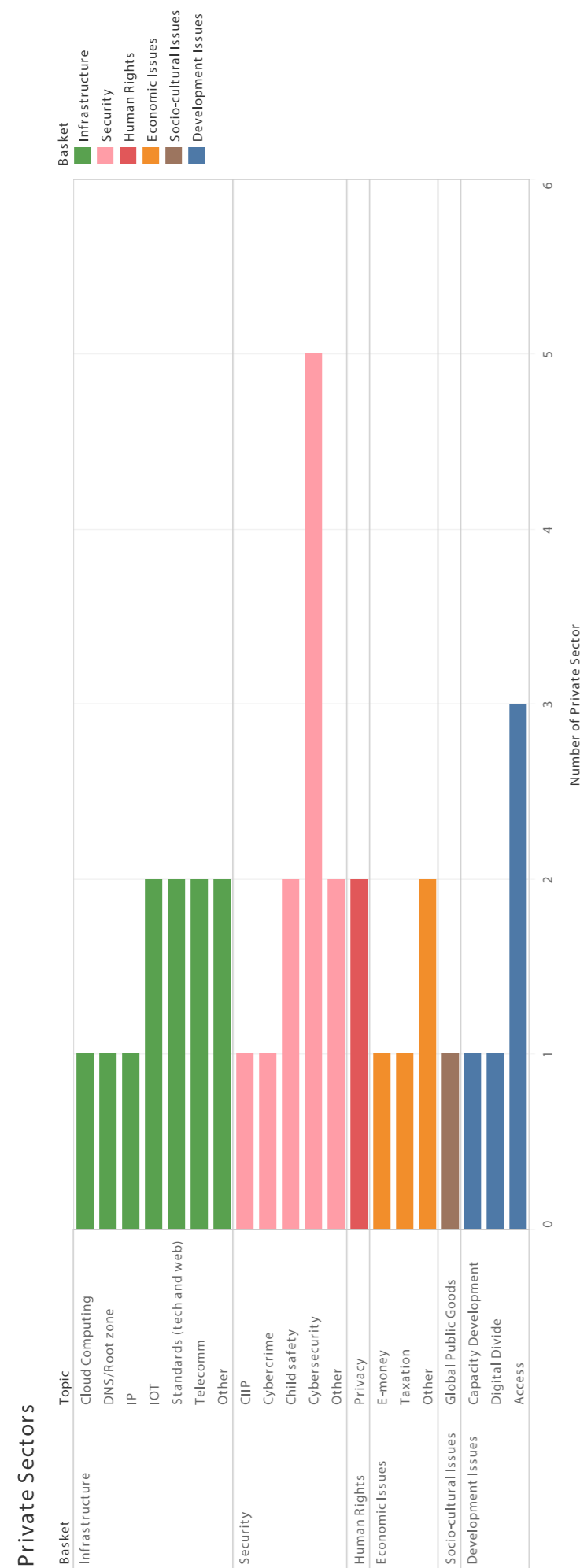


Chart 3 shows the number of sampled private sector initiatives that cover the IG baskets and their subtopics (see chapter 1 for an explanation on the IG taxonomy).

Table 3: Summary of sampled civil society organisations offering capacity building initiatives, methods of delivery and target audience.

Organisation offering capacity building initiative	Topics covered	Main capacity building activities	Method of delivery	Target audience
DiploFoundation and the Geneva Internet Platform, occasionally with partners	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues IG processes and institutions	Course on cybersecurity for South-Eastern Europe (SEE) Course on Children and Mobile Technology Introduction to internet governance Course on cybersecurity Course on internet technology and policy Course on Digital Trade	Online Blended	SEE region officials and other stakeholders; National telecom regulatory authorities; Officials in government ministries, departments, or institutions dealing with Information Society, internet and ICT-related policy issues; Diplomats at permanent missions to the UN in Geneva, and staff of IOs in Geneva.
Hivos/ DiploFoundation	Infrastructure Security Human rights Legal issues Economic issues Socio-cultural issues Development issues Introductory knowledge IG processes and institutions	Internet governance in the MENA region programme	Blended	Civic actors in the MENA region
Geneva Centre for Security Policy	Security	Course on Devising and Implementing a National Cyber Security Strategy Course on New Issues in Security	Face-to-face	National civilian and military cyber experts engaged in cyber security policy formulation; staff of international organisations, representatives from the private sector, and non-governmental organisations dealing with cyber security issues. Mid-career professionals working in national ministries, international organisations and non-governmental organisations
Global Partners Digital	Security Human rights Legal issues Introductory Knowledge	Training programme on cyberpolicy	Blended	Civil society
Association for Progressive Communications	Infrastructure Human rights Legal issues Socio-cultural issues Development issues Introductory Knowledge IG processes and institutions	Training materials on ICT policy for civil society	Available online	Civil society
ICT4Peace (in collaboration with international organisations and governments)	Security	Regional workshops	Face-to-face	Senior diplomats and technical personnel
Centre for Internet and Society	Infrastructure Human rights Legal issues Socio-cultural issues Development issues IG processes and institutions	Workshops (in partnership with other organisations)	Face-to-face	Civil society
Best Bits	Introductory Knowledge IG processes and institutions	Network as capacity building	N/a	Civil society
Together Against Cybercrime	Security Human Rights Legal issues	Courses and policy immersion	Blended	Civil society, especially youth
Open Knowledge International	Human rights Legal issues	Network as capacity building	Supporting capacity building tools online.	Groups and individuals globally interested in advocating for open data and knowledge.

the Internet in its network development, offering a range of online networking and communication tools on its website for its partners, as well as resources and documents of interest to its core concern.

Content for the courses is developed by both in-house experts and outside consultants and organisations.

### Content covered by civil society initiatives

In general, it can be said that, apart from courses offering a wide-ranging span of issues (such as DiploFoundation's Introduction to Internet Governance), civil society attends to gaps in content on IG issues, reflecting their areas of concern and what they identify as capacity development needs in the Internet community. For example, courses deal with children and mobile technology (DiploFoundation), with the use of ICTs by people with migrant backgrounds for better mutual understanding (Together Against Cybercrime – TAC), stress gender rights (the APC) as well as the needs of marginalised communities (the APC). Emphasis is given to ICT-for-Development in the APC's online modules, reflecting the discourse of the time (early 2000s). Reference to 'development' or 'ICTs-for-development' is currently less frequent in IG discourse.

There is a strong interest in cybersecurity from DiploFoundation, Global Partners Digital and the GCSP courses and programmes, while the APC and Global Partners Digital show a direct interest in human rights, including regional rights charters. Access, and issues relating to access is also a concern for the APC online modules.

Both Hivos and Best Bits emphasise 'Internet governance' as their main area of concern. Civil society courses pay less attention to e-commerce issues, although the APC does touch on these in one of its modules. The APC also shows a strong interest in the historical development of the Internet and related policy processes.

## Private sector initiatives

### Overview

Capacity development offered by the private sector presents some unique characteristics. Many initiatives that are labelled as capacity development on company websites offer information and tutorials about the best way to use products and to take advantage of their functionalities more fully. Microsoft Learning and Training, Symantec Training courses and Google for Education are some examples.<sup>41</sup> The

<sup>41</sup> Private companies also use online platforms, such as Coursera, for providing this type of training, with the aim to foment a workforce ready to work with their products. The specialisation on 'Google Cloud Platform for Systems Operations Professionals (GCP)' is a good example. The course aims to prepare professionals to work with concepts and terminology related to GCP.

latter is a project targeted at teachers that explains how to use Google products in a way that facilitates teaching and interaction with students.

Similarly, Cisco Systems provides courses on IoT Industrial Analytics and Cybersecurity, for example, aimed at explaining the functionalities of Cisco solutions to IT staff, vendors and partners, so they can better place these productions in the market. By and large, these initiatives were not included in the scope of this report, but there are grey areas: some courses of this type offer strong job market skills, in spite of the fact that they refer to the technology provided by a specific company. This is the case of some of the courses offered in Microsoft Academy, discussed in further detail below.<sup>42</sup> The existence of independent certification bodies - further analysed below - is important for fostering technology-neutral capacity development.

The private sector contributes to capacity development in several ways, including: a) indirectly, supporting the efforts of other stakeholder groups; b) directly, as the main provider of capacity development or in partnership with other stakeholder groups; and c) as a provider of certification.

### About the capacity development provided by the private sector

The private sector is one of the largest contributors to capacity development in an indirect way,

providing funding for initiatives which are organised by third parties, or having industry experts among the speakers in trainings, which usually count on a diverse group of lecturers from different stakeholder groups. The Joint International Doctoral (PhD) Degree in Law, Science and Technology, for example, counts on the support of several 'industrial partners', such as IBM, Vicomtech and Sunrise Valley. The IG schools always include speakers from the private sector. In this report, these capacity development initiatives were captured under the stakeholder group to which the main organiser belongs.

Some private sector organisations are direct providers of capacity development. These courses are usually targeted at a specific group. An example is the training offered by the **Groupe Spéciale Mobile Association (GSMA)** to policymakers and regulators. The courses are offered on-site, with a duration of three days, or online, for three to six weeks. The online training is based on the reading of texts and slides created by in-house and external experts and updated at least once a year, or more frequently, depending on how dynamically the topic evolves. Although the materials are not available online, they can be shared with third parties if permission is granted. A certificate accredited by the UK

<sup>42</sup> An illustrative example is the course 'Microsoft Blockchain as a Service', available at Microsoft Academy.

Telecom Academy is provided upon successful completion of the course.

The themes of courses provided by the GSMA are diverse, spanning across several IG baskets from infrastructure to development issues. Among them are: Principles of Internet Governance, Principles of Mobile Privacy, Children and Mobile and Technology (developed in partnership with DiploFoundation), Advanced Spectrum Management for Mobile Telecommunications, Mobile Sector Taxation, Mobile for Socio-Economic Development and Internet of Things.<sup>43</sup>

**Microsoft Academy** offers a vast catalogue of online courses to developers, IT experts, data experts and students. They cover aspects of web, cloud, database and game development, virtualisation, security and big data analytics. The courses offered to students focus on developing skills, such as learning how to code or learning the fundamentals of security, and also on how to get certification granted by Microsoft, that proves that they have acquired certain skills.

Microsoft also promotes capacity development in specific regions, especially in Africa. One example is the **Afrika Academy**, targeting recent higher education graduates, government leaders and the Microsoft partner community. Courses are offered free of charge in partnership with African universities and research institutions. They are streamed in real-time, enabling participants to interact with industry experts from across the continent, or they can be accessed on an on-demand basis. The project **Interns4Afrika** targets African youth. Students receive specialised skills in cloud technology, particularly Customer Relationship Management (CRM), through online and classroom training. CRM Certified graduates are listed in the 4Afrika employment portal for recruitment.

**Cisco Systems** provides courses on several topics in their business area, such as advanced threat security, cloud computing and convergence of technologies. They provide an ecosystem of professional certifications that cater to students with different needs. 'Cisco Career Certifications'<sup>44</sup> aim to introduce measurable rewards to professionals and to the organisations that employ them. The interested student can use a search engine to identify the best capacity development course according to their areas of interest<sup>45</sup>, desired learning path<sup>46</sup> and level of knowledge (entry, associate, professional, expert or architect).

<sup>43</sup> The complete list of courses can be found at: <http://www.gsma.com/publicpolicy/capacity-building/courses>

<sup>44</sup> Potential career paths and certifications can be visualised at <https://learningnetwork.cisco.com/community/certifications>

<sup>45</sup> Networking, Network Design, and Security; Voice and Collaboration Solutions; Data Center and Storage Networking; Service Provider.

<sup>46</sup> In the area of networking, network design and security, for example, the student can specialise in one of the following areas: Design; Routing & Switching; Network Security or Wireless.

Cisco Networking Academy is a program designed to foster individual and institutional IT skills and career advancement, in order to help create a skilled workforce. The model requires partnerships with local institutions: Cisco provides the curriculum, the online learning platform, and support, while local learning institutions hire instructors, provide equipment, and enrol students. In the case of instructor-led courses, participants meet face-to-face and access the course materials online. These courses aim to prepare participants for certification, entry-level jobs and advanced study. Cisco courses can also be taken entirely online, in a self-paced manner, aiming to expand career opportunities with insights and information from experts. The content encompasses topics such as cybersecurity, IoT, network and routing.

Someone wishing to pursue an entry level course in the field of networking, network design and security, for example, could take a Cisco Certified Entry Networking Technician (CCENT) certification course, which prepares the participant for a test on the skills required for entry-level network support positions. Certificates are valid for a certain amount of time – three years in the case of CCENT – and after that the student needs to apply for re-certification. The syllabus of the preparatory course for the certification is available online. Course materials and practice exams can be accessed on a subscription-basis. The cost of the subscription varies in accordance with the amount of time that the content will remain available, from 30 days to one year. Online preparatory courses are offered on a paid and self-paced basis. The course content is presented in videos and texts and remains available for one year. Interactivity is enabled through 'Discovery labs', content review questions and graded tests.

Companies are not the only actors to provide certification in this field. **The creation of certain independent bodies that develop a harmonised set of standards across the industry is becoming a common approach.** The Cloud Credential Council (CCC)<sup>47</sup> is an independent and vendor-neutral certification body, aimed at establishing cloud certifications for key IT roles in order to foster cloud adoption through the availability of IT professionals. A Cloud Credential Council Certification demonstrates knowledge and expertise with cloud computing best practices without tying itself to a specific technology or IT framework. Cisco is part of the network of accredited courseware providers that prepares for the 'virtualization essentials exam'. The course is focused on cloud computing and addresses the business perspective, the technical organisation, and operating and governing

<sup>47</sup> The Cloud Credential Council (CCC) is an international member-based organisation mandated to drive cloud readiness through effective competence development. The certifications were designed in conjunction with cloud computing practitioners and technologists leading cloud technology adoption worldwide to ensure compatibility and applicability in the real world. A network of accredited courseware providers, trainers, partners and members bring these standards to professionals globally – entrenching an accessible and universal set of cloud computing standards in industry.