UNITED NATIONS SYSTEM
Secretariat of the Chief Executives Board for Coordination (CEB)

CEB Survey on Frontier Issues

Summary of Responses

27 October 2017

Contents

I. Introduction

The CEB's second regular session of 2017 will include a segment on frontier issues that aims to determine how UN system entities can engage, individually and jointly, according to their comparative advantages, to address the opportunities and threats associated with new and emerging technological advances.

In preparation for and to generate input to the CEB discussion, the CEB Secretariat invited UN entities to highlight some of their relevant work in a nine-question survey (see Annex I). The request yielded nearly 300 submissions from 48 entities that reveal interesting and innovative work – both normative and operational – across a broad range of themes, utilizing a wide array of technologies.

This exercise was not intended to produce an exhaustive inventory of UN system work on frontier issues (although it is likely that, at the time of writing, the results represent the most complete picture available). Rather, it aimed to provide insight into the nature and scale of some of the more progressive work agencies are pursuing to both help manage the opportunities and risks of emerging technologies and direct them towards mandate delivery and more broadly to the achievement of the sustainable development goals (SDGs).

The survey illustrates that the UN system is already playing an important role in supporting Member States in their efforts to harness new technologies for sustainable development as well as to address normative and regulatory challenges arising from technological advances. In some domains (e.g., biotechnology, information and communication technologies in the context of international peace and security), some roles are clearly defined and well established. In others (e.g., artificial intelligence, cybergovernance), the parts UN organizations can play may not yet have been agreed or could be strengthened.[1] The CEB discussion will explore further opportunities for the UN system to utilize its strengths in convening stakeholders and supporting norm-setting.

While the responses establish that UN entities are embracing innovation in their programming and/or to improve service delivery, it is often tentative or limited – i.e. at the proposal/conceptual stage, being pilot tested, confined to a particular country context, leveraging only a small potential of the technological capability, etc. Partnership, particularly with the private sector, featured in many submissions, but further opportunities should be explored to scale up or intensify efforts. There may also be the potential for exchange of lessons or collaboration among UN entities where similar work is being pursued.

The charts and graphs that follow summarize the responses to the survey questions, with notes that provide an indication of the nature of the work reported. Readers are encouraged to refer to individual submissions for more detail, as found in the accompanying Compendium of Responses to the CEB Survey on Frontier Issues.[2]

II. Overview of UN system entities' engagement in "frontier" domains

Entities were invited to share information on their most substantial recent and forthcoming work within a set of specified technological domains: artificial intelligence, transportation and mobility, biotechnology, energy technology, data-related issues, and cyberthreats; agencies could also specify "cross-cutting" or "other".[3]

[1] Given that the results are not comprehensive, conclusions should not be drawn on the basis of the survey alone.
[2] https://www.unsceb.org/CEBPublicFiles/CEB_Survey_Compendium.pdf
[3] "Blockchain" was specified as "other" on 8 surveys, and so its own domain was created to provide visibility of the topic in the analysis.

Figure 1: Organization by Domain Matrix

Org.	Data	AI	Transport/ Mobility	Cyber	Energy	Biotech	Block-chain	Other	Cross-Cutting	Total
CEB	2									2
CTBTO	1	1						1	1	4
DOCO	2								1	3
IAEA		1		1	3				1	6
ICAO			2	2					1	5
ILO		3							2	5
IMF	2						1	1	1	5
IMO			1	1				1		3
IOM	2							1		3
ITU		1		1				6	2	10
UN[4]	14	7	8	4	1			6	40	80
UNCTAD		1							3	4
UNDP	1							2	4	7
UNEP	1				1				3	5
UNESCO	1	1						1	8	11
UNFCCC		3					2	1		6
UNFPA	2								1	3
UN-Habitat	1		2	1	1			2	2	9
UNHCR	4	1		1					1	7
UNICEF	1		2		1				5	9
UNIDIR		4		1					2	7
UNIDO		1	1		2	5		1	6	16
UNITAR		1						3		4
UNODC				2					1	3
UNRISD		1					1	1		3
UNSSC									1	1
UNU	2	2			4	1		2	4	15
UNV								1		1
UN-Women	1						1		2	4
UNWTO									1	1
UPU	3						1			4
WBG	1		1	1			1		1	5
WFP		2	1		1		1	1	3	9
WHO	1	4				4		3	3	15
WIPO	1	1		1					3	6
WMO	2							1	1	4
WTO									2	2
Total	**45**	**35**	**18**	**16**	**14**	**10**	**8**	**35**	**106**	**287**
Level of activity:		Low	Medium	High						

[4] The UN Secretariat contribution includes input from 12 of its departments, offices or regional commissions.

Figure 1 provides a snapshot of all submissions received, by entity and in which domain. Collectively, the 287 responses from 48 organizations provide an indication of the myriad ways in which UN system organizations are helping to ensure that innovation and technology are directed towards the benefit of humanity.

For the purpose of this survey, frontier issues were described as those that have high impact on social, economic and environmental spheres whereby both intended and unintended consequences are likely to disrupt or reveal gaps related to current norms, institutions and structures/processes. There is a lack of knowledge or scientific consensus on the full breadth of potential positive opportunities and detrimental effects, and insufficient public legislation and regulations to appropriately manage them. There is also a need for better risk assessment and management of disruptive and unintended consequences, but no current consensus on the approach.

Given the CEB's interest in examining initiatives broadly falling within this description, a subset of the submissions (a total of 141 surveys) were studied more intensively. Both normative activities (including "pre-normative", e.g., promoting best practices, incremental norm-setting, catalyzing stakeholder engagement, etc.) and activities that themselves apply innovative technologies were considered germane.

Figures 2 through 10 summarize the responses to the nine main survey questions for the subset of 141 submissions.

Figure 2: Activities by Domain

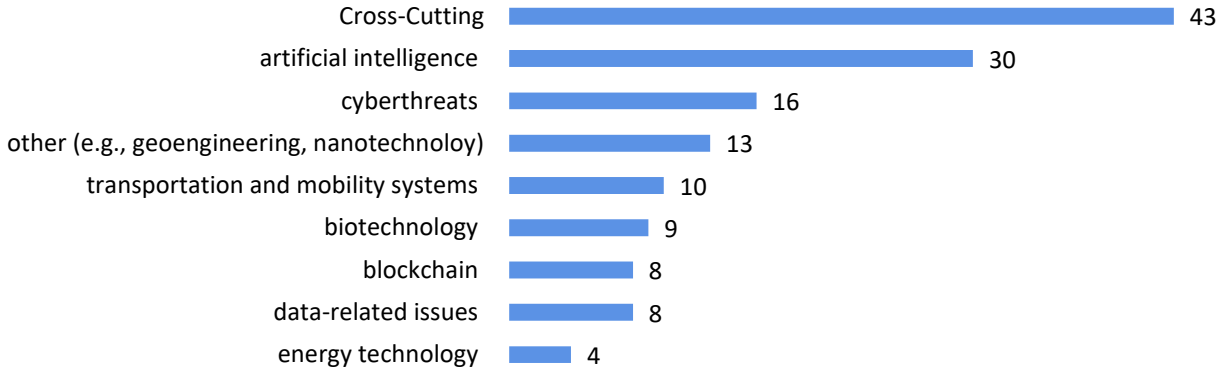


Figure 3: Activities by Function

Figure 4: Outputs

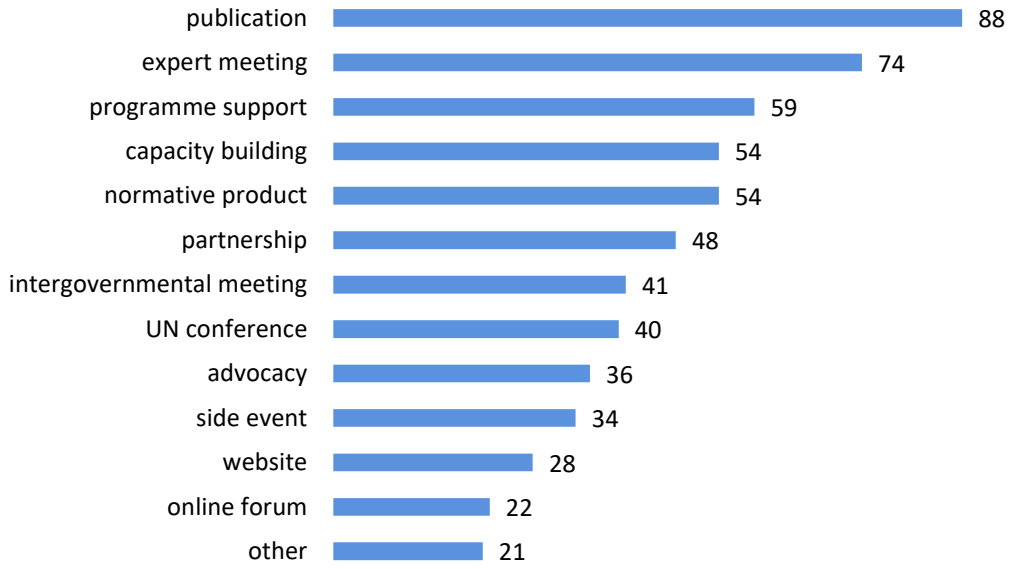


Figure 5: Actors

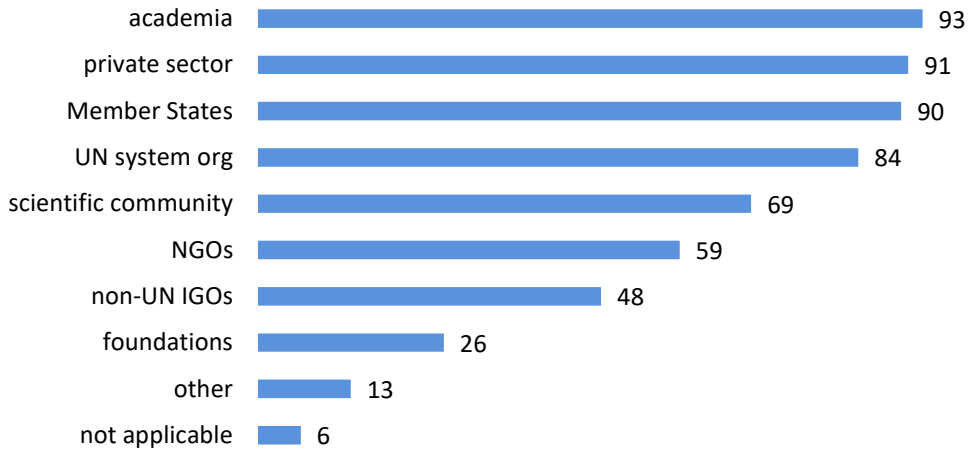


Figure 6: Beneficiaries

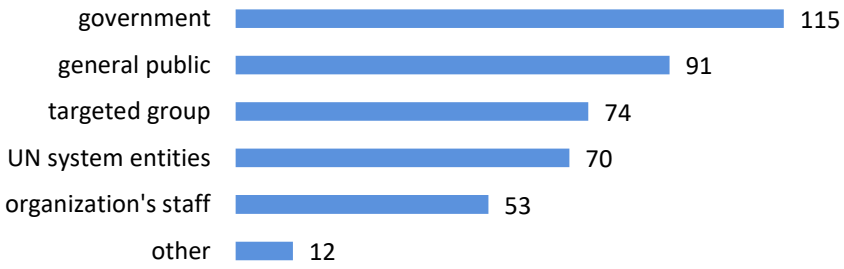


Figure 7: Personnel Support

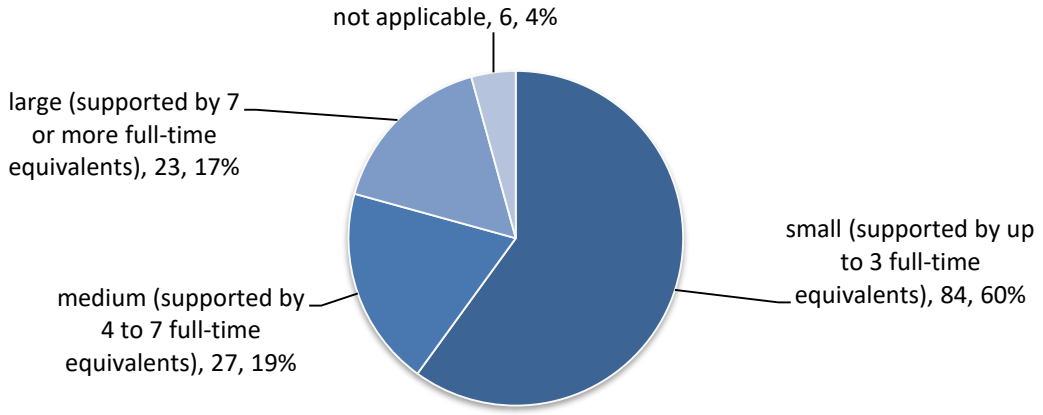


Figure 8: Financial Investment

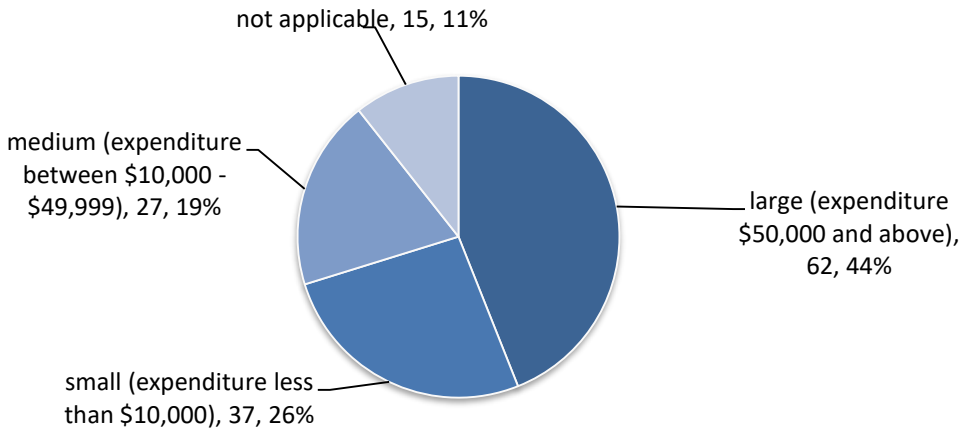


Figure 9: Work Start Time

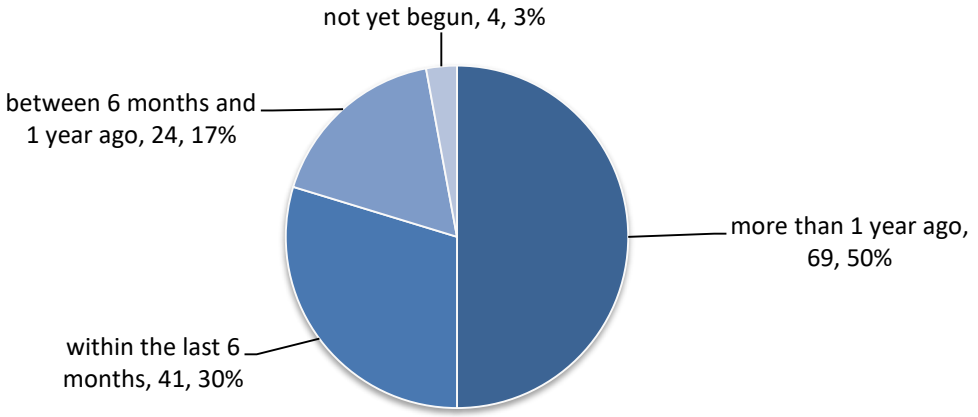
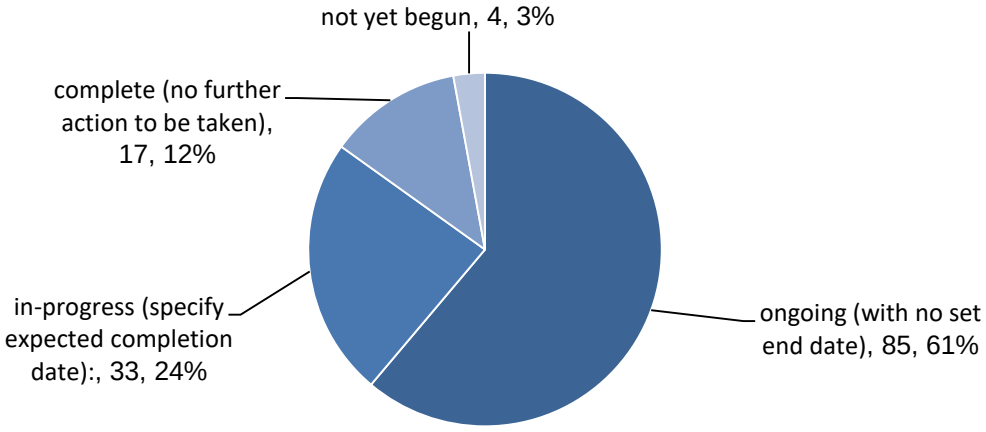


Figure 10: Work End Time



III. CEB Focus Areas

The CEB discussion will examine four areas in detail: artificial intelligence, biotechnology/converging biotechnologies, cyberspace and the peace and security implications of emerging technologies.

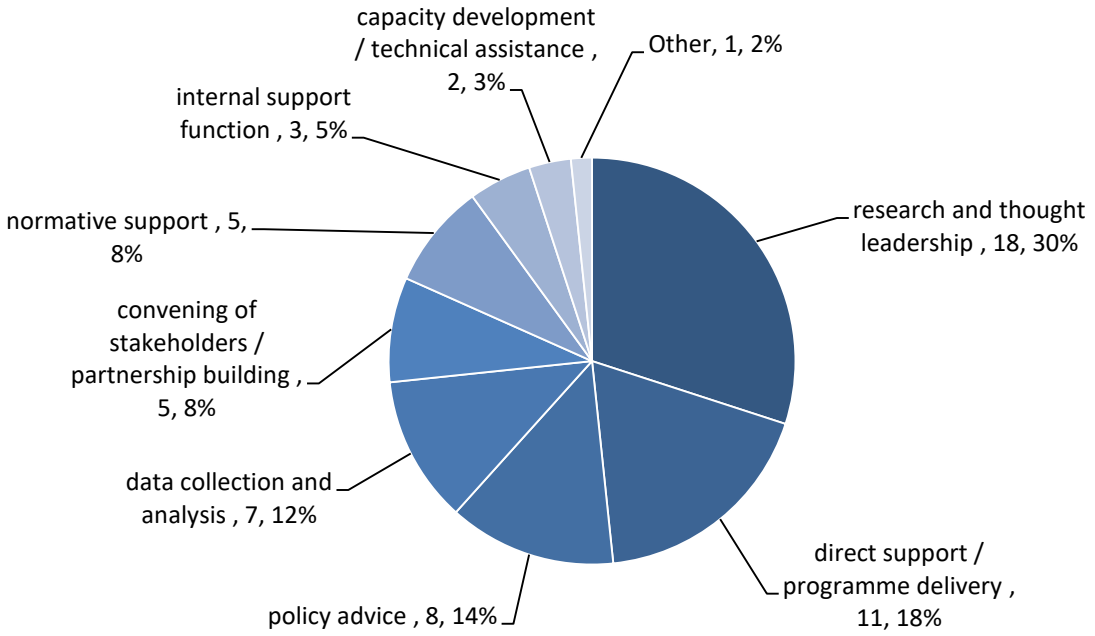
In the following sections, the responses to key questions are summarized for the surveys that were deemed to be relevant to the respective focus areas. Unless stated otherwise, they were selected from among the subset of 141 submissions that identified more closely with the description of a frontier issue. Included are the activities associated directly with the stated domain as well as other relevant activities reported to be cross-cutting or in another domain. Again, both operational applications of new technologies and norm-setting activities were included. As relevant, activities may be counted within more than one focus area.

A. Artificial Intelligence[5]

Thirty-one UN system entities[6] reported 60 activities that fall broadly in the area of artificial intelligence (e.g., automation, robotics, smart and autonomous things[7]), the largest rate of response within one of the specific survey domains. Substantive involvement centers predominantly around knowledge generation and knowledge sharing mainly through engagement in research and analysis on a diverse range of topics. A drive to learn and understand the nature, application and implications of AI to sustainable development is dominant. Applying AI tools for programme delivery is the second largest area of engagement. Limited involvement in normative or regulatory work was reported, with the exception of activities related to autonomous vehicles.

[5] The survey results outlined in this section include submissions reported by agencies within the artificial intelligence domain as well as a number reported in other domains (e.g., energy, data, transportation and cross-cutting) that were judged to be relevant.
[6] CTBTO, IAEA, ICAO, ILO, IMO, ITU, UN/DESA, UN/DGACM, UN/DPA, UN/ECA, UN/ECE, UN/ESCWA, UN/OCHA, UN/ODA, UN/OICT, UNCTAD, UNDP, UNEP, UNESCO, UNFCCC, UNHCR, UNICEF, UNIDIR, UNIDO, UNITAR, UNRISD, UNU, WBG, WFP, WHO, WIPO
[7] Activities related to autonomous weapons are discussed in part D, below, but are also counted among the statistics presented in this section.

Figure 11: Functions - AI



- The future of work is a topic that attracts considerable research attention from ILO, UN/DESA and UNU, with emphasis on the effects of automation and robotics on future employment scenarios; UNIDO is similarly exploring AI/automation's impact on the future of manufacturing. UNRISD is looking broadly at social policy responses to technological innovation that prevent the creation of new divides and reduce inequalities. UNCTAD, ESCWA (in the Arab region) and UNDP (in the Asia Pacific region) are engaged on questions of the use, impact and adoption of emerging and disruptive technologies in developing countries. Both UNU's and UNIDIR's studies, on the strategic environment in 2050 and on the ramifications of dual-use technologies for international security, respectively, are strongly geared towards policy support.

- Applications of AI for the purpose of better programme delivery / direct support, in particular in remote and dangerous areas, are being pursued by WFP and IAEA through unmanned aerial vehicle (UAVs). Autonomous drones are being tested by UNICEF, while WFP is experimenting with driverless truck technology to enhance its performance in crisis situations. UNHCR is testing messenger bots to assist refugees, and WFP is using an Emergency Response Chatbox (a "Food Bot") to assess vulnerability and needs.

- Organizations are using AI to process and analyze large quantities of data to inform a variety of efforts towards policy support and programme delivery, for example, to automate and accelerate analysis of satellite and UAV imagery to assist humanitarian response (WFP, UNITAR in partnership with Global Pulse and other actors); predict population flows (UNHCR in cooperation with WMO, UNOSAT and other non-UN entities); optimize routes, revenue, fleet management, etc. in aviation (ICAO); and improve energy distribution networks in cities (UN/OICT). AI analytics are also used by CTBTO for monitoring compliance with the Comprehensive Nuclear-Test-Ban Treaty. UN/OICT is

working to develop a "data analytics pipeline" to provide generic tools within the UN Secretariat to create data analytics products.

- Efforts to provide policy advice include UN/DESA's e-Government Survey and activities to support WSIS follow-up, UNEP's review of emerging issues related to the environment, and UN/ECA's study on intellectual property governance as it relates to emerging technologies.

- Normative work on the development of regulatory frameworks on automated vehicles by the UN/ECE Inland Transport Committee. IMO is laying the groundwork for addressing the sound operation of Maritime Autonomous Surface Ships.

- UN system entities play an important convening role and provide essential substantive support to inter-governmental and multi-stakeholder gatherings – e.g., the Artificial Intelligence for Good Summit (supported by ITU), Commission on Science and Technology for Development (CSTD) (by UNCTAD), and follow-up to the World Summit on Information Society WSIS (multiple agencies) – which, to varying degrees, address the subject of artificial intelligence and automation. UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) provides a forum for reflection on ethics, and, as part of its current programme of work, is considering (among other subjects) robotics ethics.

- In-house, UN/DGACM and WIPO are using machine translation to enhance accessibly and dissemination of documents.

Figure 12: Outputs - AI

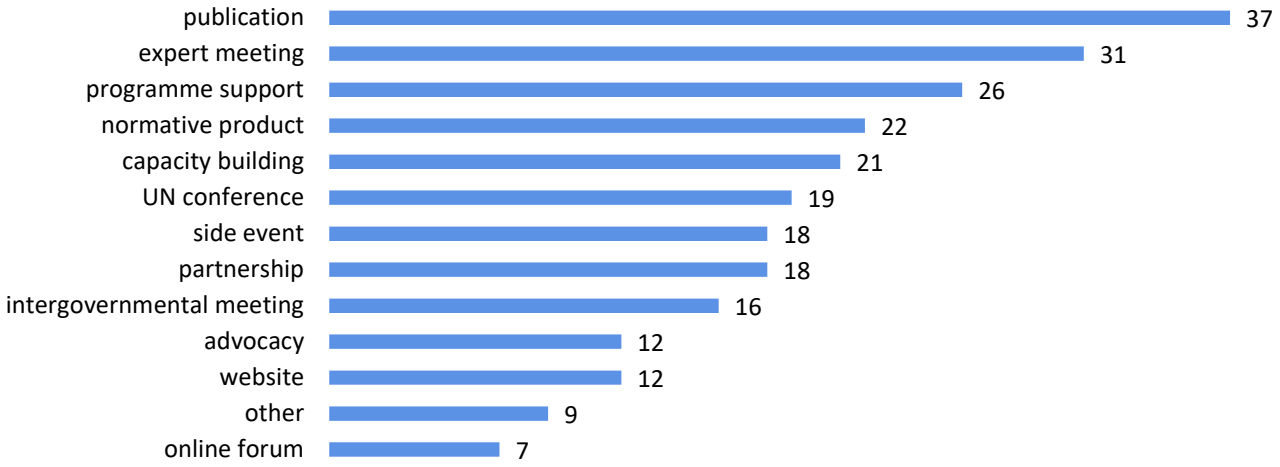
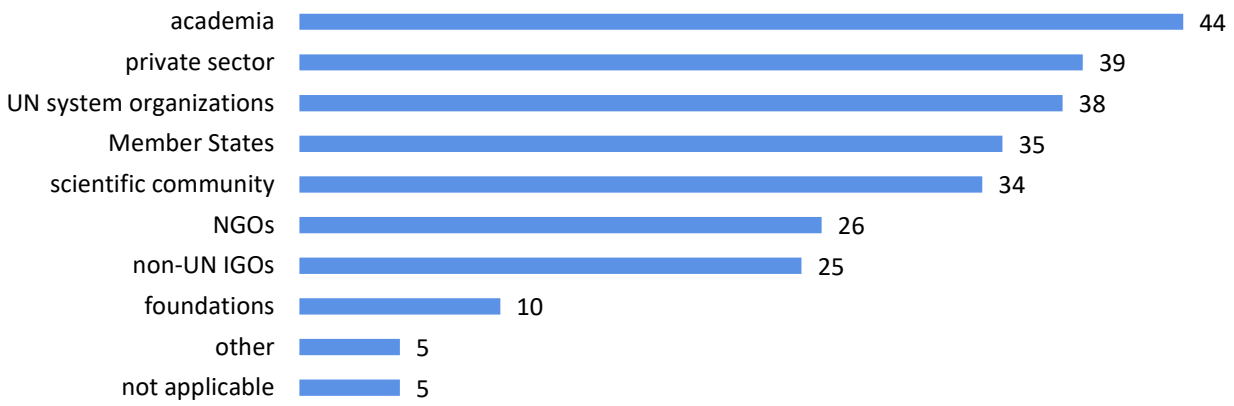


Figure 13: Actors - AI



According to the survey responses, much of the AI-related work is being pursued cooperatively with other actors – predominantly academia, other UN organizations and the private sector. Some examples include:

- ITU and 20 UN system partners organized the AI for Good Global Summit jointly with the X-Prize Foundation, coming together with AI experts from industry and academia to advance solutions to global challenges. WFP is exploring the various benefits of AI for the humanitarian sector in collaboration with IFAD, ITU, SAP, IBM Watson and X-Prize, and is in talks with Microsoft and Google.

- UN/ECE's efforts to strengthen the regulatory framework on autonomous vehicles involve ITU, the Organisation for Economic Co-operation and Development, the Eurasian Economic Commission, the Asia-Pacific Economic Cooperation, the International Motor Vehicle Manufacturers Association, the International Motorcycle Manufacturer Association, Fédération Internationale de l'Automobile, Consumer International, and vehicle parts suppliers.

- UNHCR's experimentation with predictive analytics on population flows involves WMO, UNOSAT, private sector entities and regional climate experts as partners; UNU's Institute on Computing and Society is working closely with UN Women and DPKO and with academic networks to advance "smart data" through its ICT for Development research labs on peace and gender empowerment; WFP's efforts towards deploying driverless trucks and aerial drones include partners such as the German Aerospace Agency, the Global Humanitarian Lab, the Logistics Cluster and the Belgian Development Bank; UNHCR's work on messenger bots is progressing in partnership with Facebook; UNCTAD's activities on technological advances affecting freight transport involves the transport industry and financiers; and the machine translation system that is part of UN/DGACM's gText suite of tools was co-developed with WIPO.

Figure 14: Beneficiaries - AI

Figure 15: Personnel Support - AI

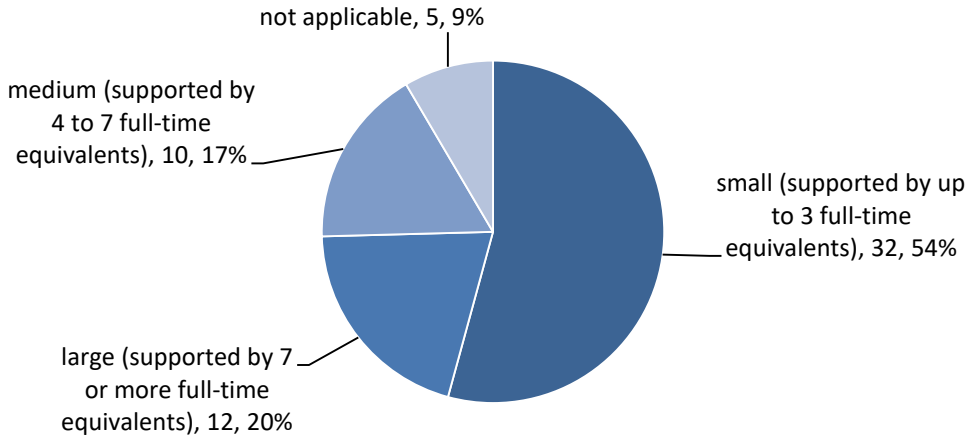


Figure 16: Financial Investment - AI

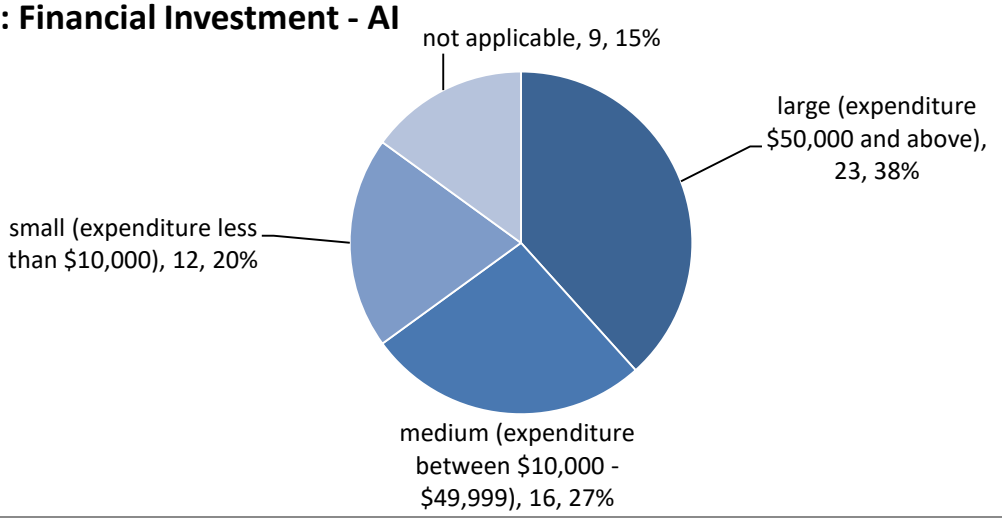


Figure 17: Work Start Time - AI

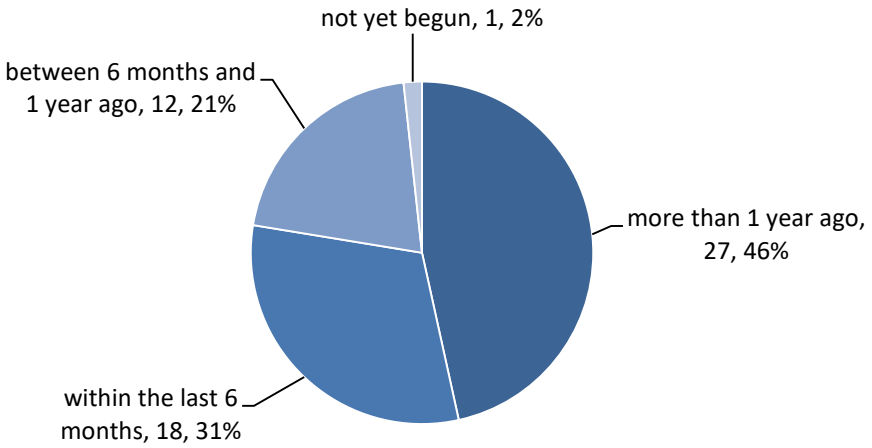
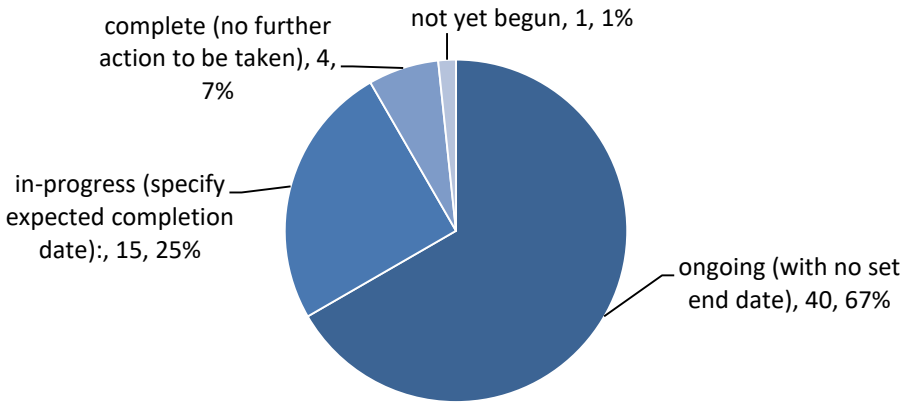


Figure 18: Work End Time - AI

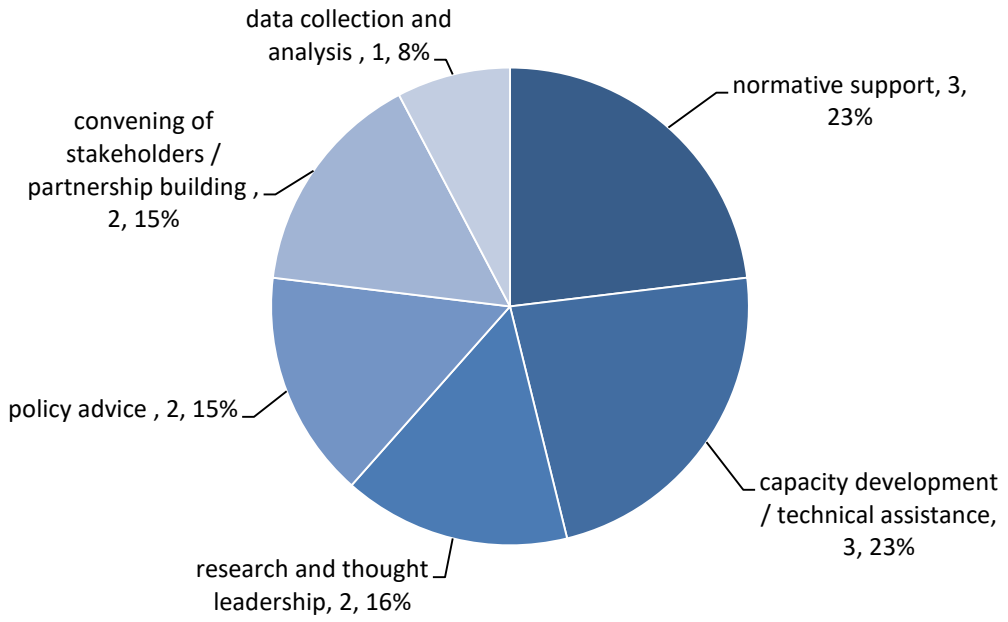


B. Biotechnology/converging biotechnologies[8]

Seven agencies reported work on 13 activities that fall within the biotechnology/converging biotechnologies domain: UNESCO, UNIDO, UN/ECA, UN/ODA, UNU, WHO and WIPO. Compared with AI, significantly less activity was reported in this field of work. In contrast, though, UN system engagement appears to be well-established, specifically in the areas of bioethics, food safety, and industrial and agricultural biotechnology. Early work by UNESCO and UNIDO dates back to the 1970s and 1980s, respectively. The UN also plays a notable convening role in this area and supports standard setting as well as application of biotechnological advances in developing countries and countries in transition

[8] The survey results outlined in this section include submissions reported by agencies within the biotechnology domain as well as some judged to be relevant to this field that were reported as "cross-cutting".

Figure 19: Functions - Biotech



- A number of intergovernmental agreements and bodies exist to address a variety of normative dimensions related to biotechnology, including ethics, biosafety/food safety, and genetic data (e.g., Intergovernmental Bioethics Committee, World Commission on the Ethics of Scientific Knowledge and Technology, Codex Alimentarius Commission, Cartagena Protocol on Biosafety). UNIDO is promoting biosafety standards within developing countries, and WHO (in a tripartite partnership with FAO and the World Organisation for Animal Health (OIE)) is developing guidance to help countries to implement whole genome sequencing for foodborne disease surveillance.

- Capacity building and technical cooperation are also important UN functions in this field, with substantial activities reported by UNESCO on bioethics and UNIDO on biosafety (in collaboration with the International Centre for Genetic Engineering and Biotechnology). UNU provides training and research through its Biotechnology Programme for Latin America and the Caribbean.

- Research activities include WHO's efforts to accelerate vaccine development for a number of pathogens that cause sexually transmitted infections and UNIDO's exploration of industrial biotechnology's potential contribution to inclusive and sustainable industrial development. WIPO's 2017 Global Innovation Index analyzes data on innovation in the agriculture and food sector.

- UNIDO plays a convening role in the context of biotechnology and food security, among other things, supporting a "South-South Biosafety Networking Programme" as well as the International Industrial Biotechnology Network, which promotes the application of biotechnology for inclusive and sustainable development.

- Policy advice is provided by ODA on emerging technologies with dual-use applications including synthetic biology and nanotechnology; and by ECA on the effects of intellectual property laws,

competition and antitrust laws on global access to, manufacturing and trade of technology-intensive goods.

Figure 20: Outputs - Biotech

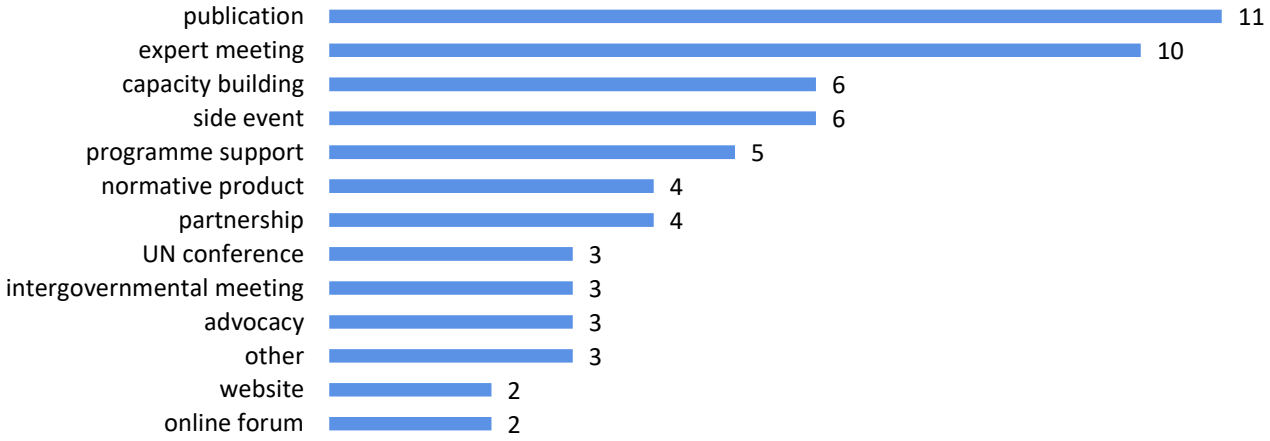


Figure 21: Actors - Biotech

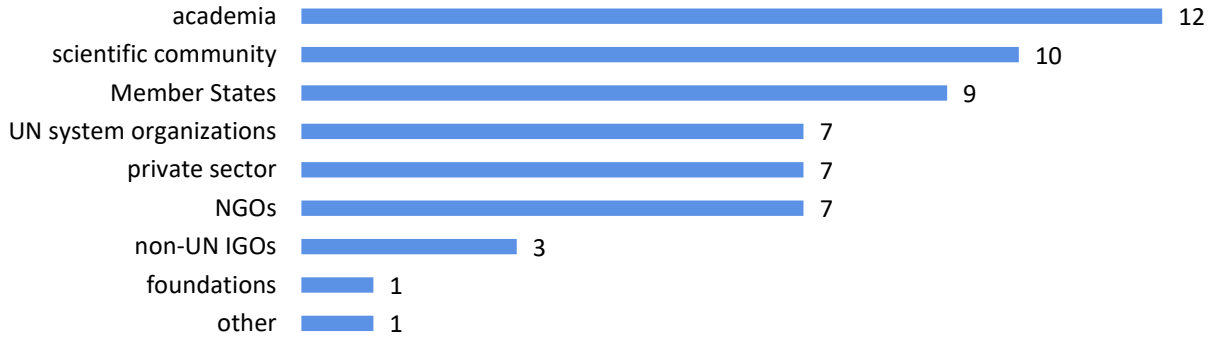


Figure 22: Beneficiaries - Biotech

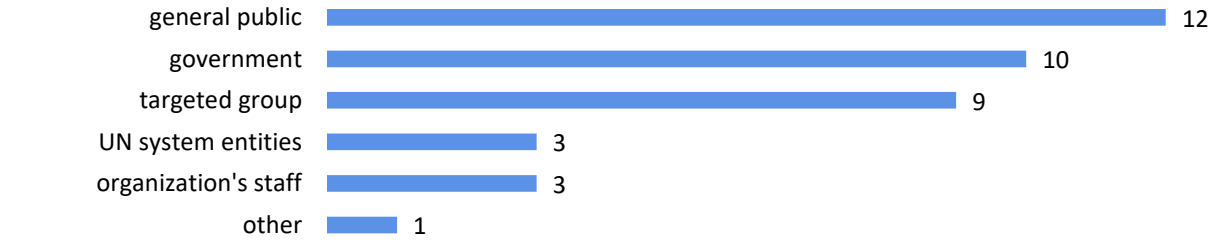


Figure 23: Personnel Support - Biotech

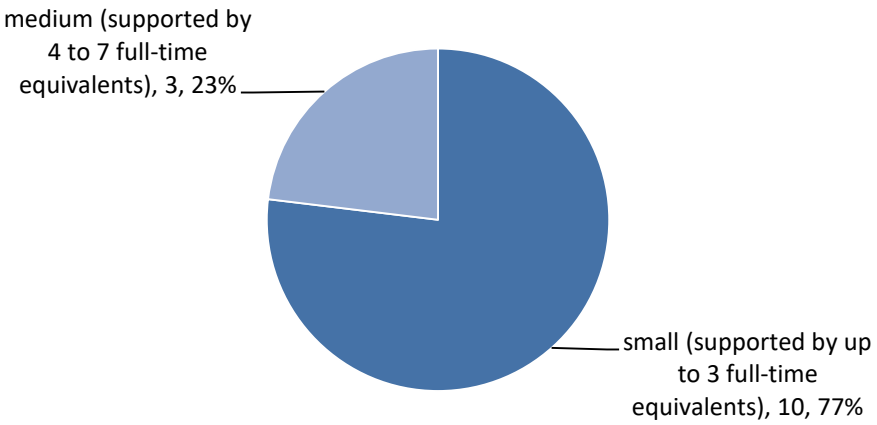


Figure 24: Financial Investment - Biotech

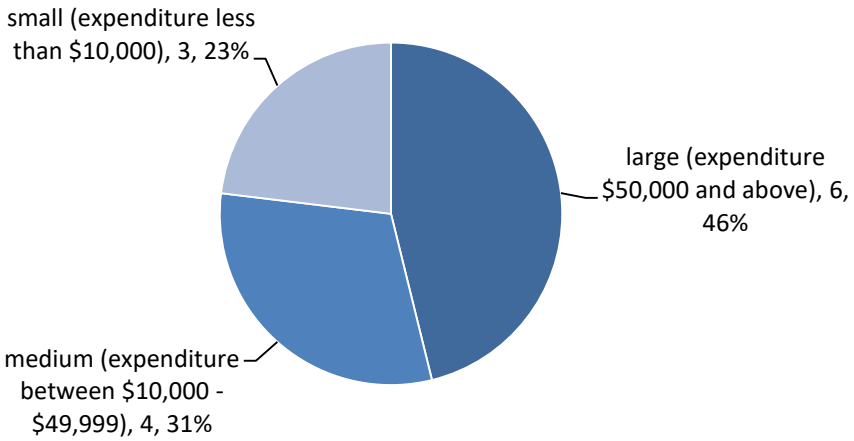


Figure 25: Work Start Time - Biotech

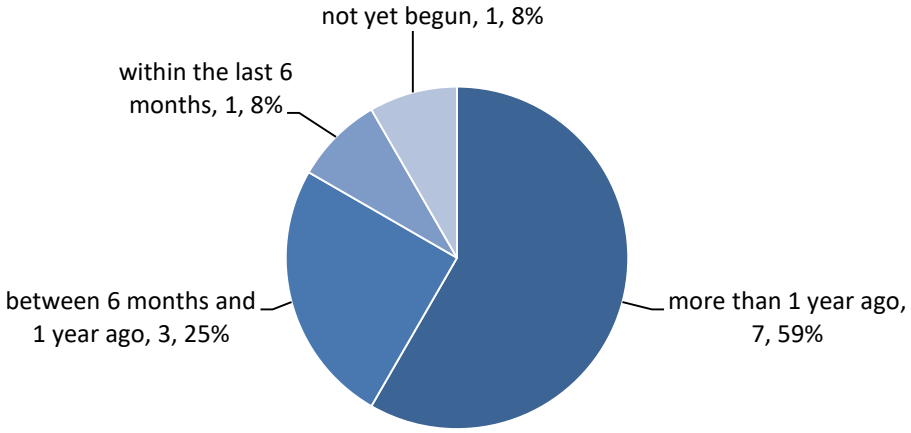
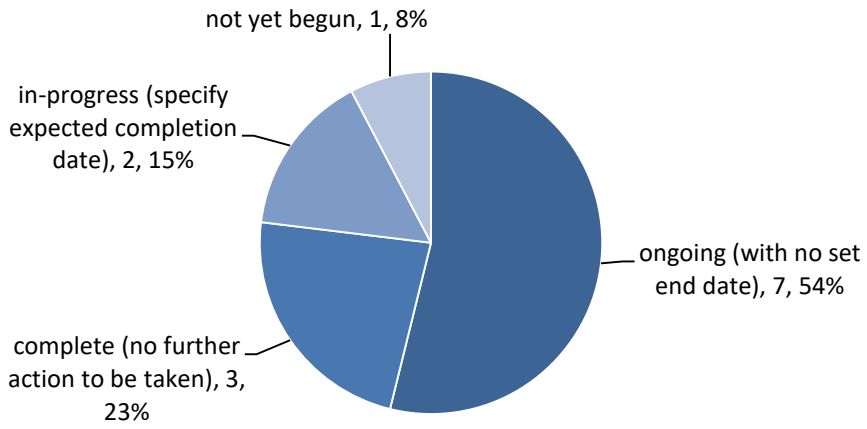


Figure 26: Work End Time - Biotech



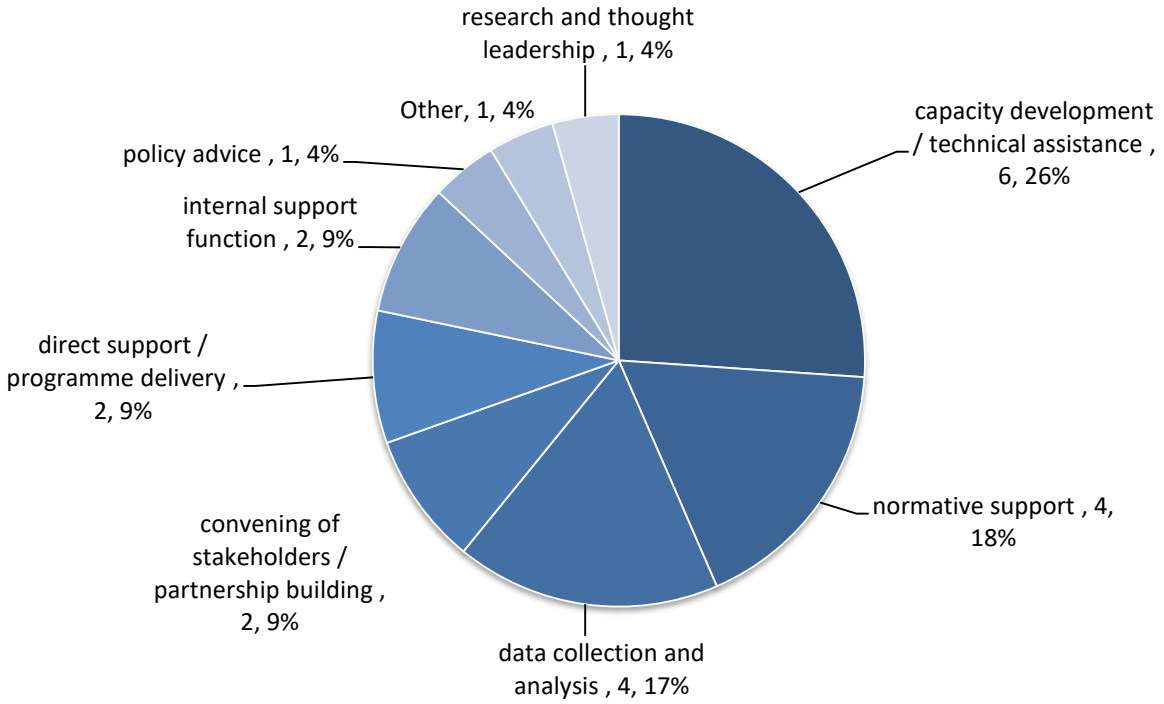
C. Cyberspace

The UN system engages with cyberspace from many aspects, including security, sustainable development and human rights.

The security aspect corresponds to the survey domain "cyberthreats". Fifteen UN system entities (IAEA, ICAO, IMO, ITU, UN/DESA, UN/ODA, UN/OICT, UNCTAD, UN-Habitat, UNHCR, UNIDIR, UNODC, UNU, WBG, WIPO) reported 23 activities[9] under this domain or under "cross-cutting" or "AI" that were deemed relevant. Capacity-building and normative support to address cyber-attacks and strengthen security at both global and country levels featured prominently, and some agencies also reported on corporate actions to manage cyber risks within their organizations.

[9] including some activities that were not part of the 141-survey subset, but determined to be pertinent to this topic

Figure 27: Functions - Cyberthreats



- Agencies reported various activities aimed at supporting norm- and standard-setting. As sole facilitator of WSIS Action Line C5, "Building confidence and security in the use of ICTs", ITU has an extensive cybersecurity programme, ranging from standardization of security architecture and frameworks to assistance to countries to develop national cybersecurity strategies and respond to cyberattacks. A series of Groups of Governmental Experts (GGE), mandated by the General Assembly and supported by UN/ODA, has been studying developments in the field of information and communication technologies (ICTs) in the context of international security, including threats, the application of International Law, voluntary norms of responsible State behaviour, confidence building and capacity-building measures. To help advance norm implementation at the intersection of cyberspace and international peace and security, UNIDIR is producing a UN system-wide mapping of relevant multilateral processes (with a focus on the General Assembly).

- In highly technical contexts, entities are assisting Member States, e.g., on computer security in the context of nuclear security (IAEA), cybersecurity in civil aviation (ICAO), maritime cyber risk management (IMO, UNCTAD), and risk management of water infrastructure and utilities (UN-Habitat). UN/ODA is developing an online training course on cybersecurity policy for Member States, based on the findings of the GGE.

- To combat cybercrime and cyberterrorism, organizations are providing data and analysis (ODC on responses by Member States to cybercrime and on drug trafficking); technical assistance and building capacity to implement policy (ODC on combatting online child sexual exploitation, UN/OICT through its goPortfolio software products for Member States to help with countering

corruption, controlling illicit drugs and combating transnational organized crime); research on organized crime and corruption in the context of technological, demographic, social and physical changes (UNU); and policy advice (IMF on risks associated with distributed ledger systems).

- The UN system-wide framework on Cybersecurity and Cybercrime (endorsed by CEB in November 2013) and a UN system Internal Coordination Plan (endorsed in 2014) aim to increase collaboration and coordination among agencies on cyber-related matters. Examples of internal UN system cybersecurity measures include a joint UN system platform "Shared Threat Intelligence Platform" to share knowledge of cyberthreats, a UN platform "Digital Blue Helmets" for information exchange and collaboration (UN/OICT), and agency-specific strategies to manage information security risks (ICAO, WBG, WIPO).

Figure 28: Outputs - Cyberthreats

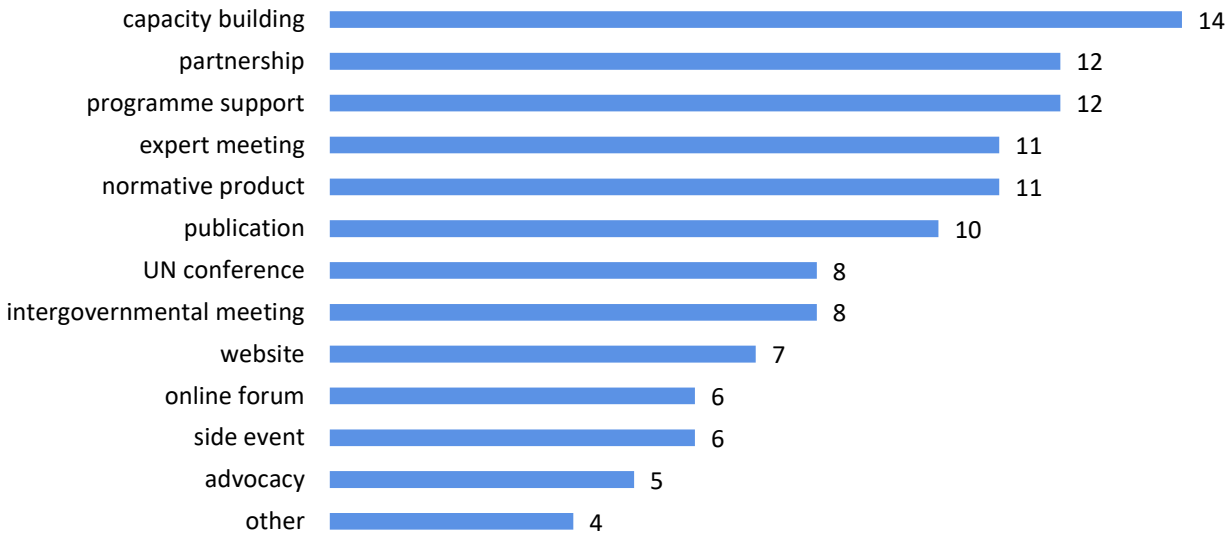


Figure 29: Actors - Cyberthreats

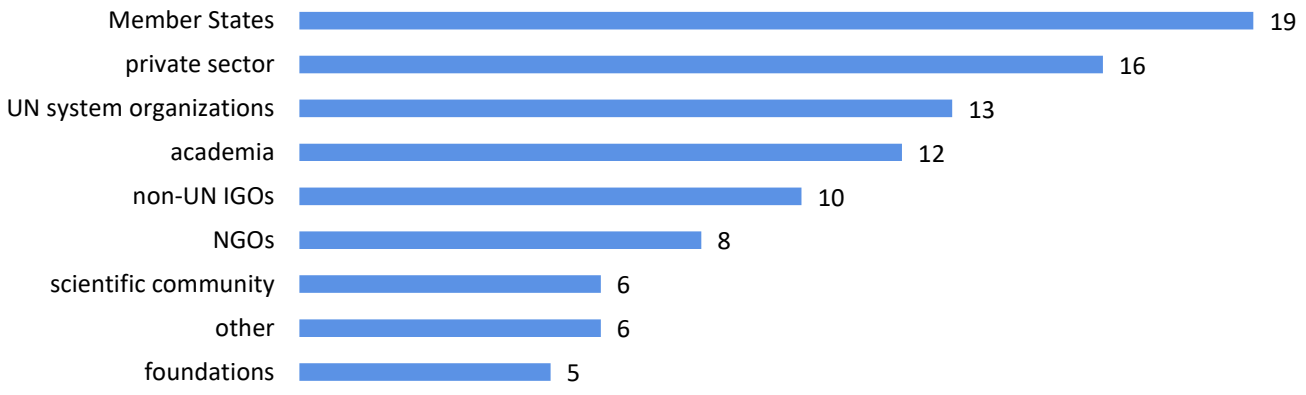


Figure 30: Beneficiaries - Cyberthreats

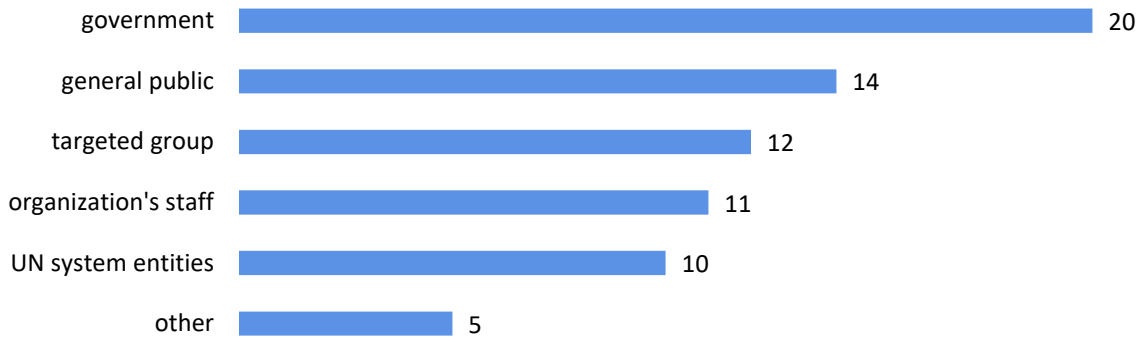


Figure 31: Personnel Support - Cyberthreats

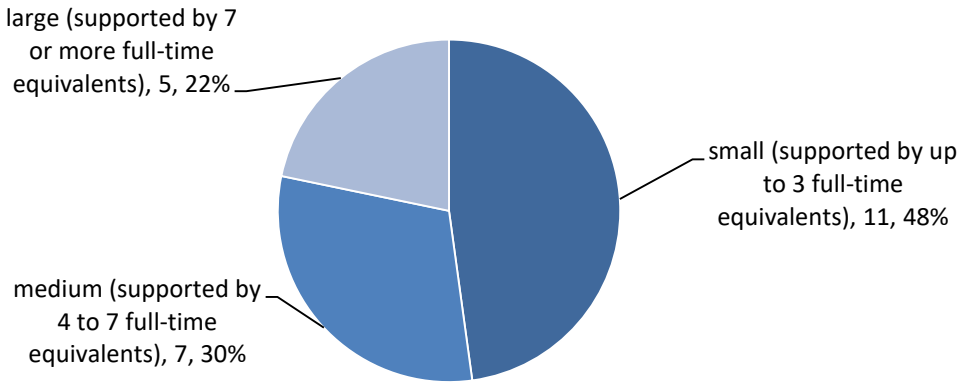


Figure 32: Financial Investment - Cyberthreats

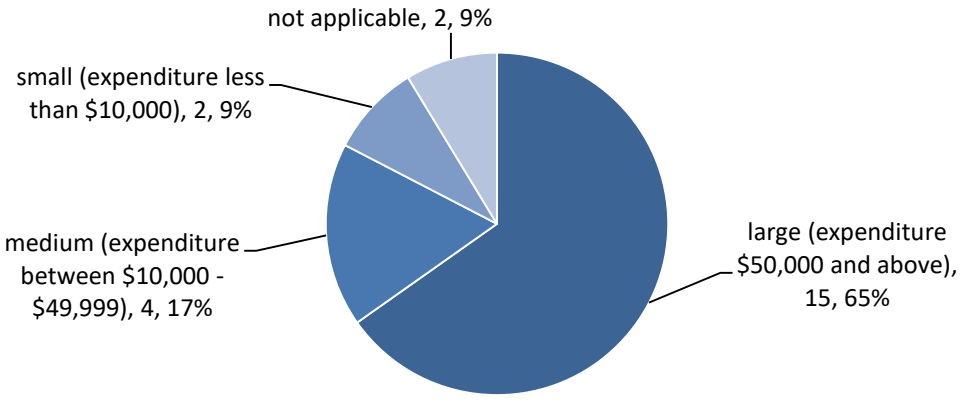


Figure 33: Work Start Time - Cyberthreats

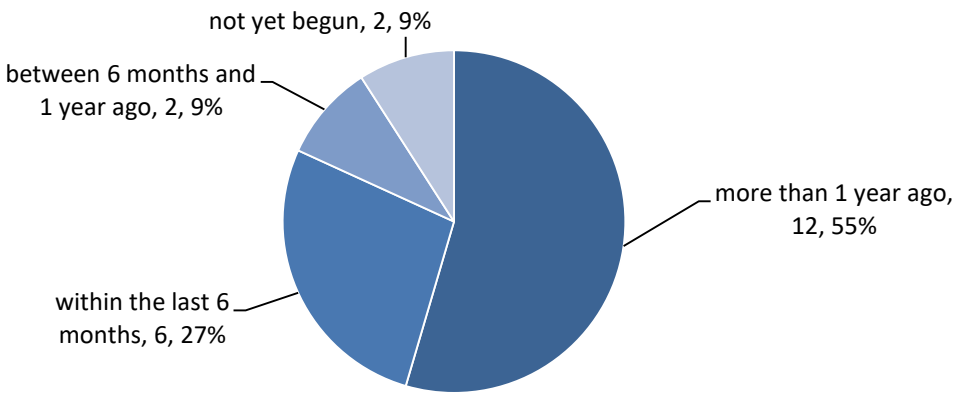
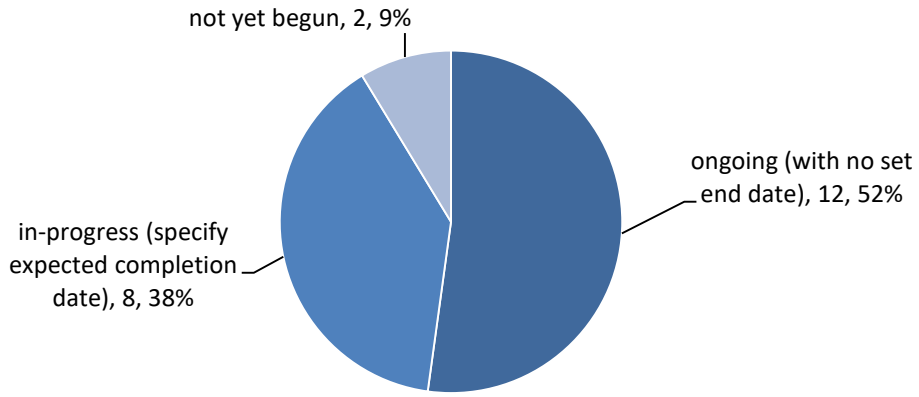


Figure 34: Work End Time - Cyberthreats



With respect to sustainable development and human rights in cyberspace, there is a much larger universe of activities being pursued within the UN system, well beyond those collected as part of the CEB survey on frontier issues. Nevertheless a number of submissions[10] provide information on efforts to foster ICTs for development, narrow the digital divide, promote effective Internet governance, and protect human rights in cyberspace. For example:

- To help countries cope with many of the challenges and to realize the opportunities presented by cyberspace, many UN system entities are providing policy advice, technical assistance and data / analysis to governments, namely, UN/DESA's flagship E-Government Survey as well as its activities in support of several WSIS action lines, UNIDO's work on the fourth industrial revolution and its impact on developing countries , ESCWA's regional activities to build capacity on ICTs and the information society among Arab governments (including through support to the Arab Internet Governance Forum), and ECA's regional review of WSIS outcomes.

[10] Reported in several domains, and including some activities that were not part of the 141-survey subset

- A number of entities (ITU, UN/ESCAP, UNRISD) continue to advance efforts to promote digital inclusion, which will contribute to achieving the SDGs and helping ensure that all people benefit from the Internet's potential. To help ensure that the economic benefits of the Internet are more widely shared, UNCTAD's recently established Intergovernmental Group of Experts on E-commerce and the Digital Economy is focusing on maximizing the development gains from the digital economy and will build a community of digital economy policymakers among developing and developed countries.

D. Peace and security implications of emerging technologies

The CEB's discussion is expected to consider the impact of artificial intelligence, biotechnology and cyberspace on peace and security.

Activities to promote cybersecurity were highlighted above in the section on cyberspace. Only UN/ODA's and UNIDIR's survey submissions on dual-use technologies (see below) addressed the threat of the use of biological agents as weapons.

The UN system's role and engagement with respect to lethal autonomous weapons systems (LAWS) and dual-use applications of AI / robotics is highly specialized, with only UN/ODA and UNIDIR reporting eight activities in this field of work. They primarily provide normative support, research and policy advice.

- Both the General Assembly (which has over past decades taken up the subjects of scientific and technology developments and their impact on international security as well as developments in the field of ICTs in the context of the international security) and the Security Council (e.g., SC 1540 (2004)) provide mandates for potential normative engagement on international transfers of dual-use technology and the risks of emerging technology to the proliferation of weapons of mass destruction to non-state actors, respectively. The UNIDIR mapping of multilateral processes on cyberspace and international peace and security will illuminate progress made and remaining challenges. To support policy-making, ODA maintains a "watching brief" on emerging weapon technologies with dual-use applications, such as additive manufacturing, AI, nanotechnology, robotics and synthetic biology.

- The Convention on Certain Conventional Weapons (CCW) provides the inter-governmental anchor for work on emerging LAWS technologies. Following the holding of a series of informal expert meetings on the subject over the course of the past three years, expert level engagement has been formalized through the establishment of an open-ended Group of Governmental Experts on LAWS, supported by UN/ODA and the CCW Implementation Support Unit.

- UNIDIR has focused on the issue of autonomous weapons through a series of cross-disciplinary expert meetings and research papers with strong emphasis on legal, technical and ethical ramifications of the new and emerging weaponry. Gaining a more comprehensive understanding of the nature and applicability of autonomous weapons systems, identifying vulnerabilities and managing risks associated with the new technologies are also central themes of the research, which is presented at the CCW.

Annex I: Survey Form

United Nations System
Chief Executives Board for Coordination (CEB)

UN system activities related to technological advances

PART 1: ENTITY INFO

Organization

Submitter's name

Submitter's e-mail

Submitter's phone number

PART 2: ACTIVITY INFO

1. Name of activity

2. Description of activity
(up to 3000 characters)

3. URL(s)

4. Domain: The broad field to which the activity is related *(pick one that best describes the primary domain).*

- ◯ the activity cuts across several science / technology / innovation domains
- ◯ artificial intelligence (automation, robotics, machine learning, etc.)
- ◯ transportation and mobility systems (electric mobility, driverless vehicles, private and commercial use of drones, etc.)
- ◯ biotechnology (genetic engineering, bioremediation, etc.)
- ◯ energy technology (solar energy, battery storage, biofuels, etc.)
- ◯ data-related issues (privacy, openness, access, etc.)
- ◯ cyberthreats (electronic attacks on networks/infrastructure/systems, malware etc.)
- ◯ other (e.g., geoengineering, nanotechnology, virtual / augmented reality, 3D printing, blockchain, etc.)

5. Function: The nature of the activity *(pick one that best describes the primary function).*

- ◯ policy advice (to support policymaking (all levels))
- ◯ normative support (implementation, monitoring and reporting on global agreements, norms and standards, etc.)
- ◯ research and thought leadership (provision of expertise, strategic advice, etc.)
- ◯ data collection and analysis (measurement, monitoring and evaluation, etc.)
- ◯ convening of stakeholders / partnership building (facilitating knowledge-sharing, consensus-building, fostering partnership and other cooperation, etc.)
- ◯ capacity development / technical assistance (strengthening capabilities of individuals, organizations or societies through, e.g., education / training)
- ◯ direct support / programme delivery (supporting the implementation of programmes / provision of services to beneficiaries)
- ◯ internal support function (including application to operations and management)
- ◉ other – please specify:

6. Output type(s): The product(s) or service(s) that result(s) from the activity*(select all that apply)*.

- ☐ intergovernmental meeting (part of a work programme of an intergovernmental body or a mandated conference / event)
- ☐ UN system-sponsored / organized conference
- ☐ side event at an intergovernmental meeting or conference
- ☐ expert meeting / workshop
- ☐ training / capacity building programme
- ☐ support to programme / project implementation
- ☐ policy or research paper / report / publication
- ☐ principles / standards / guidelines / other normative product
- ☐ informational website
- ☐ online forum / community / exchange
- ☐ interagency group / multi-stakeholder partnership
- ☐ advocacy
- ☐ other – please specify:

7. Stakeholders:

7a. Actors (excluding beneficiaries) engaged in implementing the activity (*select all that apply*).

- ☐ Member States
- ☐ other UN system organizations
- ☐ other IGOs / development banks
- ☐ NGOs
- ☐ private sector entities
- ☐ foundations
- ☐ academia
- ☐ scientific community
- ☐ not applicable
- ☐ other, please specify:

Name specific actors, if desired *(up to 500 characters)*

7b. Beneficiaries *(select all that apply)*.

- ☐ government (at any level)
- ☐ public-at-large
- ☐ targeted group(s)
- ☐ staff of your organization
- ☐ other UN system entities
- ☐ other, please specify:

Indicate specific beneficiaries, if desired (*up to 500 characters*):

8. Scale: The average level of resources the organization has committed /will commit to the activity in a year.

8a. In terms of personnel support *(pick one).*

- ◯ small (supported by up to 3 full-time equivalents)
- ◯ medium (supported by 4 to 7 full-time equivalents)
- ◯ large (supported by 7 or more full-time equivalents)
- ◯ not applicable

Explain, if desired: (*up to 500 characters*)

8b. In terms of financial investment (not including any personnel costs that have been captured in previous question) (*pick one*).

- ◯ small (expenditure less than $10,000)
- ◯ medium (expenditure between $10,000 - $49,999)
- ◯ large (expenditure $50,000 and above)
- ◯ not applicable

Explain, if desired: *(up to 500 characters)*

9. Timeline

9a. Work on activity begun (*pick one*)**.**

- ◯ not yet begun
- ◯ within the last 6 months
- ◯ between 6 months and 1 year ago
- ◯ more than 1 year ago

9b. Work is (*pick one*).

- ◯ not yet begun
- ◯ ongoing (with no set end date)
- ◯ complete (no further action to be taken)
- ◯ in-progress (specify expected completion date):

Save and fill another | Save and close

Annex II: Notes on the methodology

Data collection

On 19 June 2017, a total of 53 UN system organizations[11] were invited to share information on relevant recent and forthcoming work on frontier issues.

Information was collected through a 9-question survey (see Annex I). Organizations were asked to submit one form for each activity (or group of related / similar activities) with no limit to the number of submissions. Responses received up to and including 27 October 2017 are included in the present summary.

Each survey was logged upon receipt, reviewed by the CEB Secretariat team for content and internal consistency, and entered into a database to facilitate analysis.

Organizations were contacted, where applicable, to consider alternative responses (e.g., to select a primary domain instead of "cross-cutting", to rectify apparent inconsistencies in the submissions), clarify or elaborate on responses, complete questions left blank, or separate unrelated activities into different survey forms. The database was updated accordingly.

This exercise was not intended to produce an exhaustive inventory of UN system work on frontier issues. Results reflect what UN system entities chose to report. Given that the results are not comprehensive, conclusions should not be drawn on the basis of the survey alone. Rather, the survey may serve as a starting point for further investigation of possible opportunities.

Analysis

Entities were instructed that, for the purpose of this survey, frontier issues are those that have high impact on social, economic and environmental spheres whereby both intended and unintended consequences are likely to disrupt or reveal gaps related to current norms, institutions and structures/processes. There is a lack of knowledge or scientific consensus on the full breadth of potential positive opportunities and detrimental effects, and insufficient public legislation and regulations to appropriately manage them. There is also a need for better risk assessment and management of disruptive and unintended consequences, but no current consensus on the approach.

Given the interest in focusing on initiatives falling within this description, a subset of submissions was studied more intensively. Both normative activities (including "pre-normative", e.g., promoting best practices, incremental norm-setting, catalyzing stakeholder engagement, etc.) and activities that themselves apply innovative technologies were considered germane. An inclusive approach was taken, whereby borderline cases were generally included for further analysis.

Given the large number of responses identified as "cutting across several science / technology and innovation domains", the CEB Secretariat encouraged organizations to specify a primary domain with the intent to better illuminate which technologies were being addressed within UN system activities. Nevertheless, a significant percentage of submissions could not be associated with a dominant technology and, therefore, remain "cross-cutting".

[11] CEB members, members of the SG's delegation to the CEB, the UN training and research institutes, plus CTBTO, ISDR, UNV and UN/ODA

To gather responses relevant to the four CEB focus areas, keyword searches of the description field were used to identify submissions that were not reported within the primary domain (e.g., AI, biotechnology, cyberthreats) in order to extract a wider subset of pertinent activities. As a result, activities included in the focus area subsets will vary in terms of how closely related they are to the topic.

Care should be taken not to draw strong inferences from the absolute numbers reported in this summary as submissions vary widely in terms of scope and scale, and no weighting system was applied (in other words, a survey reporting on a single research paper produced by a single author is counted once, as is a survey describing an entire work programme supported by a dedicated office, while clearly the latter represents a larger effort).

Note that all surveys were reviewed solely on the information provided by the submitting organizations, with the free-text “description of activity” being the primary source of information. There was no independent verification of the information or additional research conducted.