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Contribution by UNMGCY

to the CSTD 2022-2023 priority theme on “Technology and innovation for cleaner  
and more productive and competitive production”

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**PRIORITY THEME 1:** Technology and innovation for cleaner and more productive and competitive production

**UNMGCY SPI input on the priority theme 1:**

Focus on the topic of innovation, technological change, and digital transformation with the goal of helping youth around the world catch up technologically and have the skills needed in Industry 4.0.

**Reducing Inequalities through Digital Public Goods and Youth Collaboration for the Sustainable Development Goals (SDGs)**

Overview:

The current world youth population is the largest seen at any time in history. There are approximately 1.8 billion people alive today between the ages of 10 to 24, with most young people living in urban areas of developing countries. Many young people in these countries experience systemic and intersectional inequalities that impede social mobility. These systemic inequalities include unequal access to Information and Communications Technologies (ICT) infrastructure as well as digital technologies.

While ensuring equal access to the Internet is critical to bridging the digital divide, it is not sufficient to eliminate digital inequality, which also encompasses technical- and skill-based disparities.

This is of special importance since the modern educational system needs to equip students with the most important Industry 4.0 skills. As many experts within academia and industry have observed, the training should be bottom-up to align with the digital transformation of the workflows based on Industry 4.0 technologies.

By reaching young people in the early stages of their careers, industry can show that industries such as manufacturing are high-tech, concerned with sustainability, and can offer a worthy career path.

Manufacturing business, for example, strives to build a system that generates improved productivity, profits, sustainability, and competitive advantage. The adoption of new technologies like AI/ML, cloud-based software platforms, and digital and operational technology infrastructure, among others, will determine the educational and training requirements needed to support the new changes across the workforce.

With such a reimagined manufacturing education ecosystem, young engineers will be able to obtain the knowledge, training, and skills to harness new technologies and succeed in the workforce.

Digital public goods (DPGs) could be a solution to help reduce the existing digital inequalities. DPGs are available to all members of society to benefit from, regardless of socio-economic background. They offer a unique opportunity to transform social protection systems and reduce inequalities in low- and middle-income countries through empowering digital public services, social enterprises, and engaging young people as co-designers. The successful implementation of open and inclusive DPGs pushes us towards a new social contract and the fulfillment of the

SDGs, in part by enabling greater digital access to young people, especially those impacted by the digital divide, like women, young girls, and LGBT+ persons.

### **Question 3:**

#### Key players/networks related to the ecosystem of green innovation:

American Society of Mechanical Engineers and Autodesk (Engineering for Change was a contributor as well) have published a report that emphasized that the manufacturing industry of tomorrow will require more than new technology and that companies will need a highly skilled and adaptive workforce.

World Programme of Action for Youth (WPAY) has also highlighted information communication technologies as a priority area and listed specific action items such as providing training to promote the use of information and communications technologies and protecting youth from its detrimental elements.

A great example of digital public goods reducing digital inequality can be found in the work done by the Digital Public Goods Alliance, which is a multi-stakeholder initiative to accelerate the attainment of the SDGs in low- and middle-income countries by facilitating the discovery, development, use of, and investment in digital public goods. Currently, this Alliance is prototyping DPGs to scale in many lower income countries by addressing key elements of the digital divide such as connectivity, digital identity, digital skills and literacy, and critical public services. It is chaired by the International Telecommunication Union (ITU), United Nations Children's Fund (UNICEF), Norway, Sierra Leone, and India's iSpirit.

Another example of effective use of DPGs to reduce digital inequalities is the Giga initiative by UNICEF and ITU. This initiative aims to bring internet connectivity, critical open-source software, and digital financial services to schools in countries and communities with low Internet access.

SMART Africa is also a great example of a bold and innovative commitment from African Heads of State and Government to accelerate sustainable socio-economic development on the continent, ushering Africa into a knowledge economy through affordable access to broadband and usage of information and communications technologies. The SMART Africa Alliance has five pillars which reflect the five principles of the Smart Africa Manifesto. These pillars are (1) Policy, (2) Access, (3) e-Government, (4) Private Sector/Entrepreneurship and (5) Sustainable Development. The pillars are built on four cross-cutting enablers of (1) Innovation (2) Communications and Advocacy (3) Capacity Building and (4) Resource Mobilization. The five pillars and four enablers, when effectively developed and combined, will contribute to economic growth and job creation, which remains the goal of the Smart Africa Manifesto.

### **Question 4:**

#### Challenges that youth face in promoting green technology and innovation to contribute to the progress towards the SDGs:

Key business drivers such as cost pressures, supply-chain disruption, productivity, and sustainability have created technological, workflow, and operational changes that demand new workforce skills for optimal results. Without fundamental end-to-end changes in education from academia to industry, there is a risk of widening the skills gap. In order to overcome this challenge of successfully transitioning to Industry 4.0, there is a need for a transformation in both industry practices and training programs.

One of the biggest challenges that youth face today is that much of today's engineering education curriculum has not changed, in U.S. for example, since the 1955 Grinter Report, which emphasized mathematics and physics over project-based learning and hands-on applications. Therefore, the current curricula lack modern developments in digitalization. Even more important, some engineering programs teach an almost 80-year-old pedagogy with software packages that are more than three decades old. As a result, skills gaps are widening among the younger generations of new manufacturing workers.

Industry voices have clearly called out the large gaps between the jobs skills required and the candidates' skill sets. The skills gap will only widen as manufacturing firms accelerate their digital transformation to Industry 4.0. Employers increasingly seek more advanced computing and data analysis skills.

With the adoption of IoT and other Industry 4.0 technologies, large volumes of operational data will be available. Engineers will need the tools and skills to extract meaningful information and insights from the data.

### **Question 5:**

What should governments, the private sector, organized civil society, and other stakeholders do so that developing countries can benefit from these technologies:

To prepare students for the modern industrial needs, educators need to adapt their curricula to teach in-demand, Industry 4.0 skills. Academia should work closely with industry to develop new pedagogies to teach and develop interdisciplinary knowledge and skills. The youth need to begin learning Industry 4.0 technological skills as their new baseline of educational development.

New design for manufacturing and digital skills will be required by engineers to equip them to perform the jobs required to support new workflows. Manufacturing education programs need to recognize the significant skills gaps between graduates and industry workforce requirements and take steps to create new advanced manufacturing coursework that teaches the in-demand industry concepts, skills, and competencies.

These new skills categories are:

- Technical/hard skills (AI/ML, programming, data analysis, visualization)
- Soft skills (collaboration, communication, problem-solving)
- Interdisciplinary skills (systems engineering, automation, sustainability, supply chain management, PLM, integrated CAD/CAM)

Mechanical engineers will play key roles in developing better products that are designed for manufacturability and are leaner, smarter, and more sustainable. To successfully design more complex products, mechanical engineers will need increasing levels of hard skills for technologies like advanced additive manufacturing and a variety of computer aided engineering and software capabilities.

At a fundamental level, however, strategies are needed to enhance the use of digital public goods, especially in developing countries, to reduce digital inequalities in order to allow access to Industry 4.0 skill development opportunities. Several recommendations are suggested in order to promote a global digital commons and reduce digital inequalities. Primarily, these consist of the creation, adoption, and governance of DPGs as well as the need for greater stakeholder engagement, particularly of young people and marginalized groups.

Some concrete recommendations are the following:

- Increase capacity-building among marginalized people around how to use digital technologies effectively. Promoting digital skills and digital literacy, particularly among population groups at greatest risk of structural inequalities and digital inequalities specifically, must be specifically emphasized.
- Strategies should be formulated to ensure DPGs are well maintained in the long term, including providing incentives for efficiency and accountability. For example, multilateral institutions should create financial incentives that promote the long-term funding and maintenance of DPGs.
- Make further efforts to ensure strong and inclusive policies and governance of such resources. This is crucial to increase access to digital technologies and internet connectivity. Also, governance must be multilateral and multi-sectoral to ensure that a variety of perspectives, approaches, and agendas are represented.
- National digital transformation strategies should support and prioritize the development and deployment of DPGs that are deemed highly adaptable or else with a proven potential to address local-specific priorities. Engagement from key stakeholders, such as youth groups and academia, should be sought to determine which DPGs might be best suited for these purposes.

### Stakeholder involvement and youth engagement

- To engage people from all affected groups, stakeholder involvement should be intergenerational. Youth engagement is important as young people are particularly affected by digital inequalities. Initiatives should therefore attempt to engage young people through coproduction of digital products and initiatives as well as in the governance of these products. Youth capacity-building is essential to adequately prepare young people to take part in this process and equip them with the necessary skills to effectively engage and advocate for digital equality.
- Youth groups should be given the tools and resources necessary to not only experiment with DPGs in controlled settings but also to become agents of information and deployment within their own communities.
- Stakeholder involvement must be intersectional, representing a broad range of marginalized populations, especially those most at risk of structural and digital

inequalities, such as women, indigenous populations, people with disabilities, refugees, and internally displaced persons.

**Question 7:**

What actions can the international community, including the CSTD, take to help youth in developing countries take advantage of green technology and innovation for cleaner and more productive and competitive production:

Coordination between UN agencies and youth initiatives related to digital technology is necessary to both avoid redundancy in work streams and to increase the impact of any initiatives started in this space. Additionally, coordination would ensure that diverse perspectives are incorporated into the decision-making process. Thus, it would be useful to create an inter-agency space with young people and youth-led groups focused on issues related to science-policy, including digital technology.

**Question 9:**

Documentation/references/reports on this priority theme used for the above UNMGCY SPI input:

“Reducing Inequalities through Digital Public Goods and Youth Collaboration for the SDGs”: <https://www.un.org/development/desa/dspd/2022/01/digital-public-goods-and-youth-collaboration-for-the-sdgs/> (Policy Brief)

“Future of manufacturing: new workflows, roles & skills to achieve Industry 4.0 business outcomes”: <https://www.autodesk.com/campaigns/education/transforming-manufacturing-education-report> (Report)