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Ladies and gentlemen, it is my great pleasure and my honour to address you here today on behalf of UNESCO.

I would like to begin my remarks by expressing my deep appreciation and sincere thanks to the African Strategy for fundamental and applied Physics (ASFAP). for organizing this conference as a global platform for exchange in science literature.

Science is humankind's greatest enterprise. Produced every 5 years, the UNESCO Science Report is a flagship report monitoring trends in science governance now for almost 30 years. The report has taken on an even bigger role since the adoption of the United Nations' Sustainable Development Goals in 2015, as it is one of UNESCO's main tools for monitoring countries' progress towards these goals. One of the most striking take-home messages from the report launched this year is that the world has changed a lot over the past five years. The report documents the extent to which countries have been nurturing their science systems over the past five years, to determine which development path they are following. These science systems were put to the test in 2020 when the Covid-19 pandemic swept across the world. In this crisis, countries have turned to science both for advice and for practical solutions. The pandemic has energized knowledge production systems, with an often-unparalleled level of collaboration observed between public and private actors and at international levels that has culminated in the approval of the first vaccines against Covid-19 in record time. Development priorities have aligned. Countries of all income levels are prioritizing and pursuing an ambitious agenda of developing green and digital societies in parallel. This transition is proving challenging, as it takes considerable investment and, if handled wrongly, could exacerbate social inequalities. Governments in developed countries will need to make sure that jobs lost in one industry can be recreated elsewhere and governments in developing countries will need to ensure that the process of industrialization fosters an inclusive knowledge economy to reduce poverty levels and foster international competitiveness.

This reflects a double imperative. On the one hand, the clock is ticking for countries to reach their Sustainable Development Goals by 2030. On the other, countries are convinced that their future economic competitiveness will depend upon how quickly they transition to digital societies and green economies. Developing countries cannot afford to be bypassed by the Fourth Industrial Revolution, for that would stretch the technological gap with developed countries even farther. The report's subtitle, 'the race against time for smarter development', is an allusion to these twin priorities.

Developing countries are investing heavily in infrastructure, particularly transportation routes such as roads, ports and railways, energy infrastructure and digital infrastructure. Countries are striving to ensure universal access to energy by combining expansion of the grid with renewable sources of energy such as wind, solar and hydropower.

Education

Confronted with a strong demand for higher education, a growing number of developing countries are investing in virtual universities. This should have stood them in good stead during the Covid-19 pandemic.

Over the past couple of decades, the young have adapted seamlessly to a world characterized by Internet and mobile phone technology. Given the chance, they will also embrace a world driven by advanced robotics, artificial intelligence, blockchain, big data and other technologies characteristic of the Fourth Industrial Revolution (Industry 4.0). Education systems will need to prepare the young for the world of work they will encounter tomorrow. This will entail equipping school pupils and tertiary-level students both with hard skills in terms of technical skills and knowledge and with soft skills such as critical thinking, creativity and problem-solving.

Educational reform is all the more urgent, in that there is currently a skills shortage in Industry 4.0 fields. How will countries realize their transition towards digital and green societies unless they can draw on the potential of their talent pool? Currently, women account for one in three researchers and have achieved parity in life sciences. However, they account for only one in five (22%) professionals in artificial intelligence and one in four (28%) engineering graduates. Tech start-ups founded by women find it hard to access finance: just 2% of venture capital is being channelled towards these.

We are in a race against time for smarter development but, one-third of the way to 2030, we are yet to hit our stride SG Guterres (2021 UNESCO Science Report).

Respect for high environmental standards will, thus, become an increasingly important factor.

This seventh edition in the series arrives at a crucial juncture, as countries approach the halfway mark for delivering on their Sustainable Development Goals. The report finds that sustainability science is not yet mainstream in academic publishing at the global level and that it is developing countries which are publishing most, proportionately, on related topics.

Countries are not all at the same stage of development, of course. For developing countries, their transition to digital and green societies is obliging them to accelerate a process of industrialization and infrastructure development that would normally take decades. This process presents an opportunity to reduce dependence on foreign technologies, as long as governments can ensure that industrialization and infrastructure development intersect with local capacity-building.

The dual transition to digital and green societies is driving industrial policy. Among developed countries, there is a desire to revitalize the manufacturing sector by investing in cutting-edge technologies such as 3D printing, robotics, smart textiles and biomanufacturing. Among developing countries, the aim is to industrialize as quickly as possible. By developing their domestic science base, developing countries will be able to reduce their dependence on imported technology. Here, too, industries being nurtured include high-tech fields, such as electronics, aeronautics and pharmaceuticals.

These trends suggest that the current knowledge gap could narrow in the coming years, as long as the challenge of chronic underfunding of research can be overcome: four out of five countries still spend less than 1% of GDP on research and development.

Governments not only need to invest more in research and innovation. They also need to invest more strategically in research and innovation. Despite the policy priority accorded to sustainable development, sustainability science does not yet seem to be mainstream.

So how can physics help fast track and especially developing countries in the race for smarter development.

What can be the role for physics and why this discipline today?

It derives its present name from the Greek word for nature. translated as “knowledge of nature”. Physics, then, means studying nature at its most base level. Along with chemistry and biology, physics completes the trinity of the original “hard” sciences

I would like to quote Raspanti’s , novel, “A Novice’ss Guide to the Mysteries of the Universe”, Matthew ‘Most people know, at least in some vague way, that the sophisticated technology that drives our society has been driven in turn by fundamental discoveries of physics. But just what is physics? It studies the fundamental building blocks of the universe and how they interact. It seeks answers to such fundamental questions as: What kind of world do we live in? How does it work? What are the fundamental laws of nature? Thus, physics is the basic science from which all others have derived’.

Unfortunately, physics is the least known and the most intimidating of all sciences. Besides having calculated the age of our sun and how long we can reasonably expect it to keep on burning. However, physics it is vital for new technologies that all of us use every day from solar panel technology to wind turbine, engineering design, and the smartphone! Nuclear physics which has given us nuclear power, and nuclear medicine which has opened up new avenues of medical treatment for such things as cancer.

How Physics Applies to Environmental Science

Physics has massive implications for the environmental sciences.

Climate change modelling, ocean cycles. Physics will show how climates will change and the long-term effects on both land and aquatic ecologies.

Renewable energy: The contribution of physics to the environmental sciences is no better demonstrated than in the development of renewable energy. Also, physics has

been fundamental in developing turbines - the science behind wind farms that also generate electricity.

Finally, physics can be used to calculate the amount of energy produced by the processing and burning of biofuel just as it has for fossil fuels.

Pollution and Human Health: Similar to climate change, physics is key to understanding occurrences and the spread of aerial pollution. This has massive implications for public health. Not only physics and physicists measure aerial pollutants, suggest and develop methods of mitigating it

Scientific Collaboration and UNESCO

Promoting and facilitating scientific cooperation and the sharing of knowledge and expertise is also a founding principle behind the establishment of the growing UNESCO network of category 2 centres and category 1 institutes. Together with UNESCO networks of Academic Chairs, these specialized centers and institutes are hubs of scientific cooperation and a seat of learning where the next generation of scientists, earn a higher education experience rooted in cooperation and in the sharing of data, experience, tools, and innovative ideas.

One such Centre called ERAIFT was established in Rwanda. UNESCO launched postgraduate training in tropical forest management in 1999 at the University of Kinshasa in the Democratic Republic of Congo. Named ERAIFT (École régionale post-universitaire d'aménagement et de gestion intégrés des forêts tropicales), It is training a new generation of African physicists and specialists and decision-makers to apply the ecosystem approach in situ to forest management in Africa.

Future Challenges and Opportunities for Physics

It is the science dedicated to understanding how our world and the universe behaves and why it does what it does. Today, it overlaps with many other sciences and has had a profound impact on the environmental sciences just as chemistry has. There will always be the need for physics as it is so important to all other sciences - chemistry, biology, technology, engineering and so on. These are the future challenges for physics.

Climate Change Mitigation

This will require forging stronger links with climatology and other environmental sciences, to predict and model the effects of climate change Much remains to be understood about the atmosphere and the relationship with weather patterns. The answers should come through a combination of physics and chemistry and applications of chaos theory.

Energy Needs vs Cleaner, Greener Technologies

A growing population requires more energy needs, but the needs of climate change mitigation mean we must do everything we can to reduce our energy consumption and carbon footprint. In this regard, advances in applied physics will provide answers. It has

also developed nuclear power; what new technologies lie for the remainder of the 21st century will only build on our growing energy needs for a growing population.

The Internet

The big stories at the moment as far as the web is concerned are cloud storage, big data, and the "internet of things". The internet is an invention of physics. The challenge though is to continue to drive forward technologies for increasingly faster web access, easier connectivity of new devices, to deliver enough storage to hold that data in the cloud.

Africa

Africa and gender are the two global priorities of UNESCO.

The AU AGENDA 2063 is Africa's blueprint and master plan for transforming Africa into the global powerhouse of the future. It is the continent's strategic framework that aims to deliver on its goal for inclusive and sustainable development. The Science, Technology and Innovation **Strategy for Africa** (STISA-2024) is the first of the ten-year incremental phasing strategies to respond to the demand for science, technology and innovation to impact across critical sectors such as agriculture, energy, environment, health, infrastructure development, mining, security and water among others.

Only one in four Africans has access to Internet, despite the rapid penetration of mobile technologies. Ensuring universal access to energy is a priority on a continent where only 48% of the population has access to electricity. Countries are investing in solar and wind energy to complement extension of the grid. In research, there is a trend towards greater intraregional collaboration, with most countries now counting other African countries among their top five scientific partners. Regional centres of excellence are a growing part of the African research landscape.

Africa sustainable development is challenged due to increasing water stress, environmental degradation and climate change.

Sub-Saharan Africa, which is one of the most rapidly developing regions in the world with great educational needs. The African Strategy for Fundamental and Applied Physics (ASFAP)

Driven at the grassroot level by physicists to

Establish in Africa a culture of physics community-driven exercise

Complement top-down strategies

We support this effort and encourage a broad community participation

We look forward to the final report and its key recommendations for African physics education and research

Closing remarks

According to the global risk report 2020, science-related biggest risks that threaten our world in the years to come are failure of climate change mitigation and adaptation; extreme weather events; natural hazards, man-made environmental disasters; biodiversity loss and ecosystem collapse, and water crises. Physics and its sub disciplines have a critical role to play.

As a science dedicated to understanding how our world and the universe behaves and why it does what it does, physics is critical today in providing information and solutions for a sustainable planet and our future.

Physics is part and parcel of our daily lives. Physics helps you to understand the world around you and satisfy your curiosity. Studying physics develops your critical thinking and problem-solving skills. Physicists are versatile, which opens a wide range of future careers. Hence there is a dire need to promote and to raise the value of physics as a science enabler!

It's the duty of the physics community to raise the value of physics and make the invisible visible! UNESCO look forward to working with you.