A glowing lightbulb is the central focus, with its filament illuminated. The background is a soft, light blue gradient. Overlaid on the background are faint, white circuit board traces and nodes, suggesting a technological or industrial theme. The text is centered within a dark, semi-transparent rectangular box.

# LINKAGES BETWEEN KENYAN ACADEMIA, INDUSTRY AND GOVERNMENT.

DR. CAROLINE KARIUKI

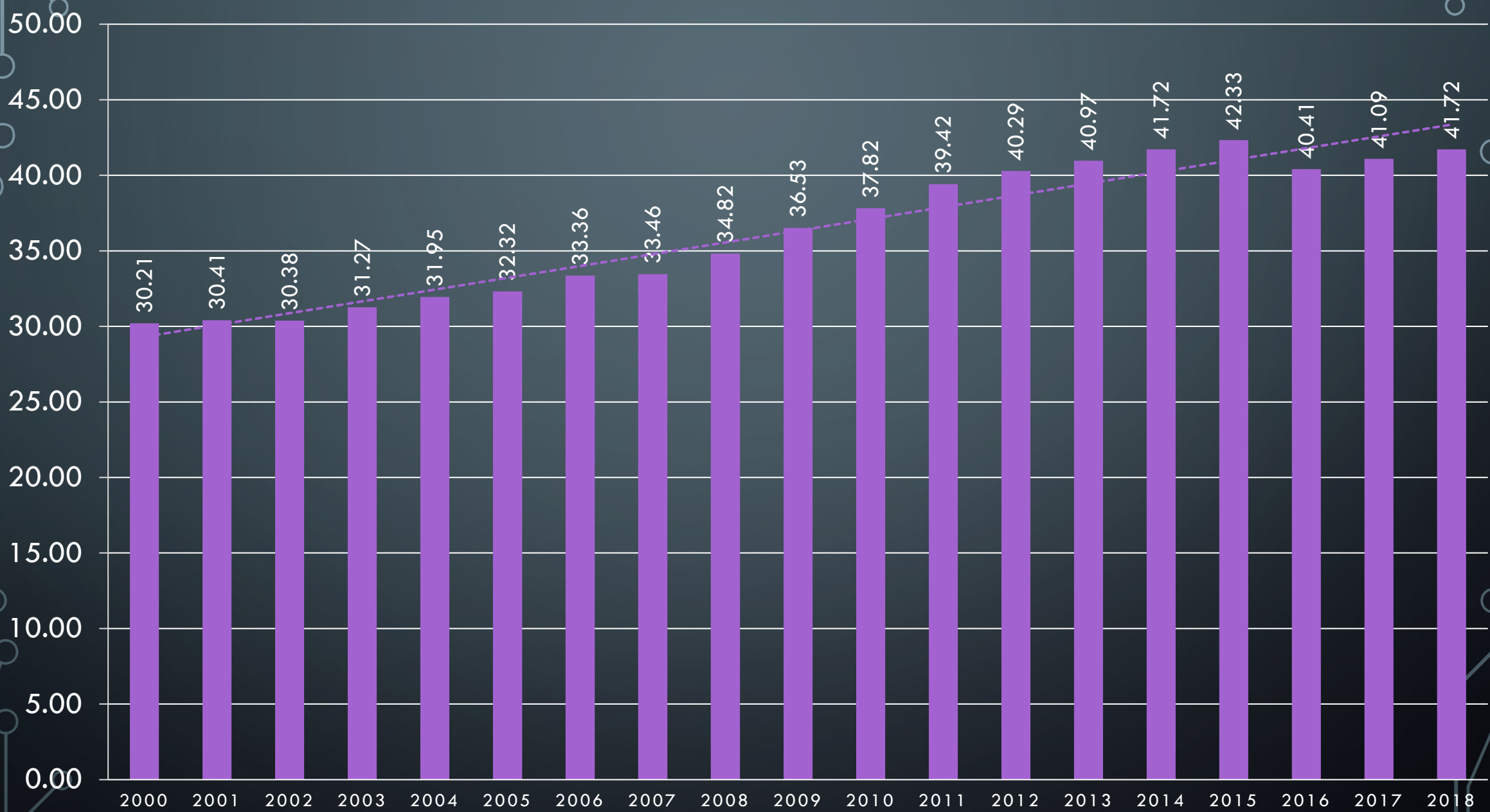
# PRODUCTIVE CAPACITIES

- “Consensus on the need to foster productive capacities for sustained economic growth and development.”

(UNCTAD Productive Capacities Index, 2021)

- Productive Capacities Index – Calculated using data from 8 categories: Information and communication technologies; structural change; natural capital; **human capital**; energy; transport; private sector; and institutions.

# HUMAN CAPITAL - KENYA



# HUMAN CAPITAL CATEGORY

1. Expected years of schooling
2. Research and development expenditure as a share of GDP
3. Researchers in research and development per million people
4. Health adjusted life expectancy
5. Health expenditures as a share of GDP
6. Fertility rate

# RESEARCH AND DEVELOPMENT (R&D)

- Investment in R&D plays an important role in economies. Promotes: economic growth, job creation, innovation, industrial competitiveness, energy technology, agriculture, transportation, public health & well-being, and environmental protection.
- Since 2000, global R&D expenditures have more than tripled in current dollars, from \$677 billion to \$2.2 trillion in 2019. (Global Research and Development Expenditures: Fact Sheet, 2021).



# RESEARCH AND DEVELOPMENT (R&D)

- In 2019, the 20 largest R&D-funding countries accounted for \$2.078 trillion in R&D expenditures.  $\approx 94.5\%$  of the global total.

<b>Expenditure on R&amp;D, 2019 - billions of current PPP dollars</b>			
<b>Rank and Country</b>	<b>Amount (\$)</b>	<b>Rank and Country</b>	<b>Amount (\$)</b>
1 United States	657.50	11 Canada	29.30
2 China	525.70	12 Spain	24.90
3 Japan	173.30	13 Turkey	24.20
4 Germany	147.50	14 Australia	22.40
5 South Korea	102.50	15 Netherlands	22.30
6 France	72.80	16 Sweden	19.30
7 United Kingdom	56.90	17 Israel	18.70
8 Russia	44.50	18 Switzerland	18.60
9 Taiwan	44.00	19 Belgium	18.20
10 Italy	38.80	20 Poland	17.20

(Global Research and Development Expenditures: Fact Sheet, 2021).

# RESEARCH AND DEVELOPMENT (R&D)

Total expenditure on R&D -in '000 current PPP\$

Country	2010
South Africa	4,424,739.53
Morocco	1,485,126.90
Kenya	763,561.19
Tunisia	745,522.37
United Republic of Tanzania	335,472.15
Uganda	243,762.59
Ethiopia	217,525.72
Burundi	7,891.81

UNESCO Institute for Statistics estimates

# RESEARCH AND DEVELOPMENT (R&D)

- In 2017, regional averages for the share of GDP devoted to R&D activities were:
  - 2.5% - North America and Western Europe
  - 2.1% - East Asia and the Pacific
  - 1.7% - World
  - 1.0% - Central and Eastern Europe
  - 0.7% - Latin America and the Caribbean
  - 0.6% - Arab States
  - 0.6% - South and West Asia
  - **0.4% - Sub-Saharan Africa**
  - 0.2% - Central Asia

(UNESCO Institute for Statistics estimates, February 2020)



# RESEARCH AND DEVELOPMENT (R&D)

- As at 2010, the Gross domestic expenditure on R&D as a percentage of GDP was  $\approx 0.8\%$  for Kenya.
- As at 2010, Total R&D personnel per million inhabitants (FTE)  $\approx 1,012$ . Headcounts  $\approx 1,474$ . (UNESCO Institute for Statistics).

Total R&D personnel per million inhabitants (FTE) - 2010	
Burundi	33.74
India	408.81
Tunisia	1,873.12
China	3,068.99
Japan	7,050.99
Germany	8,499.99
Republic of Korea	9,793.98

# UNIVERSITY-INDUSTRY-GOVERNMENT COLLABORATIONS

- Collaborations between academia and industry play an important role in the innovation process & development of goods and services that better respond to customer needs.
- Collaborations have been hampered by factors such as:
  - Culture – different aims, incompatibility with regards to intellectual property rights, language.
  - Institutional – nature of the work, understanding of what is an outcome, structure of firms.
  - Operational – different organisational processes, inefficient project management, lack of information about partner preferences in terms of results.

See: Roshani, M., Lehoux, N., & Frayret, J. (2015). University-Industry Collaborations and Open Innovation: An Integrated Methodology for Mutually Beneficial Relationships.

# UNIVERSITY-INDUSTRY-GOVERNMENT COLLABORATIONS

- **Open Innovation:** Fuelling the innovation process with both external and internal ideas. An organisation does not just rely on their own internal knowledge, sources and resources for innovation.
- Market failure.
- **The role of government:** Come in and provide the adequate support and funding that is needed to lead to new products, discoveries, unlocking productive capacities, etc. – to improve the welfare of citizens.

# UNIVERSITY-INDUSTRY-GOVERNMENT COLLABORATIONS

- Investment in R&D, and increased collaboration between universities, industry and the government will help Kenya produce goods and services efficiently and competitively – increase in productive capacity.

A close-up photograph of a glowing incandescent lightbulb against a dark blue background. The bulb is lit, with a bright yellow-orange glow emanating from the filament. The glass of the bulb is clear, and the internal structure, including the filament and support wires, is visible. The text "THANK YOU" is overlaid in white, sans-serif capital letters in the center of the image.

THANK YOU