

## Science, Technology and Lifelong Learning: Foundations for Innovation-Driven Sustainable Futures in Emerging Economies

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### Abstract:

Science, Technology and Lifelong Learning are increasingly important to economic growth, social transformation and sustainable development. For emerging economies, particularly in Nigeria, strengthening scientific capacity, technological infrastructure and opportunities for continuous learning can support responses to food insecurity, public health challenges and climate vulnerability. Anchored in National Innovation Systems Theory, this study examined stakeholders' perceptions of how science education, lifelong skills development, university-industry-government collaboration, digital transformation, adaptive policy frameworks and indigenous knowledge contribute to innovation-driven sustainable development. A survey design was used and data were collected from 356 stakeholders drawn from universities, research institutes, industry, government and policy agencies using self-developed questionnaire with a reliability index of  $\alpha = 0.89$ . Descriptive and inferential statistics were used to analyse the data. The findings reveal that investment in science education, lifelong skills development, research-industry partnerships and digital transformation are important predictors of perceived innovation performance. Respondents also recognised the value of lifelong learning for technological creativity, research productivity, entrepreneurship and knowledge transfer, while indigenous knowledge was considered important for contextual relevance and inclusive participation in innovation. The study concludes that sustained innovation capacity in emerging economies depends on stronger alignment among education, lifelong learning, research, industry, technology and governance. Coordinated action and targeted investment are therefore needed to support inclusive and sustainable development.

### Keywords:

Emerging economies, lifelong learning, innovation systems, science and technology, sustainable development.