



RETURNS ON INVESTMENTS IN HEALTH RESEARCH AND DEVELOPMENT(R&D) IN KENYA



OBJECTIVE

To estimate returns on Investments In Health Research And Development(R&D) In Kenya

INTRODUCTION

The value of Health R&D lies in its ability to catalyze positive change, drive economic competitiveness, promote environmental stewardship, and enhance societal well-being, ultimately serving as a catalyst for Achieving sustainable development goals on a local, regional, and global scale.



INTRODUCTION

Health R&D involves:

- ❖ Identifying a need or a problem
- ❖ Generating an idea or solution
- ❖ Converting that idea into a product or service
- ❖ Testing the product or service for efficacy, effectiveness, and value
- ❖ Launching the product or service
- ❖ continuing to monitor, evaluate, and improve the product or service
- ❖ Sunsetting the product or service when it becomes obsolete.



INTRODUCTION

- ❖ Increasing investment in health research and development (R&D) in Africa is crucial for achieving both economic growth and improved health outcomes on the continent.
- ❖ African countries spending on R&D is low at 0.45% of their GDP on R&D, well below the global average of 1.7%, (World Bank, 2024).



INTRODUCTION

- ❖ Investment in R&D is crucial for the health sector, offering innovative solutions and evidence for preventive interventions, treatments, and care pathways.
- ❖ There is a recognized need to boost investment in health R&D to address the continent's health challenges and enhance global health security.

A close-up, blue-tinted photograph of a microscope's objective lens and stage, serving as the background for the left side of the slide.

INTRODUCTION

- ❖ Funding for health R&D in Africa has been lower compared to other regions globally (World Bank, 2024).
- ❖ While under-investment in R&D remains a challenge, **success stories like South Africa** demonstrate the potential of tax-based incentives to encourage private sector R&D investments. (Bowen, 2021).



INTRODUCTION

- ❖ **Kenya** stands out as a nation committed to scientific advancement as shown in the . National Blueprint Vision 2030 (Government of Kenya, 2007).
- ❖ World Bank data indicate that Kenya's R&D expenditures is estimated at approximately 0.70 percent way below developed countries like Israel (5.6%), China (4.93%), South Korea (2.43%), and Singapore (2.16%) (World Bank, 2024).



METHODOLOGY

GENERAL MODEL

$$\begin{aligned} GDP_t = & \beta_0 + \beta_1 \ln(HLTHR\&D)_t + \beta_2(FD)_t + \beta_3(GOVEXED)_t + \\ & \beta_4(ICT_SER_EXP)_t + \beta_5(INTERNET)_t + \beta_6(FDI)_t + \beta_7(GCAPFORM)_t + \\ & \mu_t \dots\dots\dots (1) \end{aligned}$$

GENERALIZED ARDL MODEL

$$\begin{aligned}
 \Delta(GDP)_t = & \beta_0 + b_{1i}(GDP)_{t-i} + b_{2i}\ln(HLTHR\&D)_{t-i} + b_{3i}(FD)_{t-i} + \\
 & b_{4i}(GOVEXED)_{t-i} + b_{5i}(ICT_SER_EXP)_{t-i} + b_{6i}(INTERNET)_{t-i} + b_{7i}(FDI)_{t-i} + \\
 & b_{8i}(RCAPFORM)_{t-i} + \sum_{i=1}^p \gamma_j \Delta(GDP)_{t-i} + \sum_{i=1}^{q_1} \partial_j \Delta \ln(HLTHR\&D)_{t-i} + \\
 & \sum_{i=1}^{q_2} \delta_j \Delta(FD)_{t-i} + \sum_{i=1}^{q_3} \vartheta_j \Delta(GOVEXED)_{t-i} + \\
 & \sum_{i=1}^{q_4} \theta_j \Delta(ICT_SER_EXP)_{t-i} + \sum_{i=1}^{q_5} \tau_j \Delta(INTERNET)_{t-i} + \sum_{i=1}^{q_6} \tau_j \Delta(FDI)_{t-i} + \\
 & \sum_{i=1}^{q_7} \sigma_j \Delta(RCAPFORM)_{t-i} + \\
 & \mu_t \dots \dots \dots (2)
 \end{aligned}$$

ESTIMABLE MODEL

$$\Delta_f(GDP)_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta(X)_{t-i} + \sum_{i=1}^q \beta_2 (Z)_{t-i} + \lambda (ECT)_{t-i} + \mu_t \dots \dots \dots (3)$$



EMPIRICAL RESULTS

Notably, the estimated return on investment (ROI) from Health R&D investment is an impressive 1: 2.4 in the short run and 1:4.7 in the long run.

Each dollar or shilling invested in Health R&D has the potential to generate a return of up to 2.4 and 4.7 times the initial investment in the short and long run. This underscores the transformative power of health R&D investment in Kenya's development journey.

Investments in health R&D have a substantial positive impact on GDP per capita, and growth underlining the pivotal role of innovation and advancement in health for driving economic development.

The government prioritizes investments in health R&D not only for the generation of additional returns but also to enhance citizens' well-being through advancement of better prevention and treatment approaches.

There is a need to leverage investments in health R&D to foster growth and innovation opportunities, it is essential to enhance investment in innovative ecosystems.

EMPIRICAL RESULTS

Table 1. Summary Statistics (T=1991-2021)

Variable	Obs	Mean	Std. Dev.	Min	Max
Log of GDP per capita	31	6.601	0.685	5.423	7.635
Log of Health R&D	31	8.751	0.403	8.082	9.362
Financial Development	31	26.545	4.68	18.496	36.699
Gov Expenditure on Education	25	5.428	0.899	4.02	7.336
FDI inflows	31	0.797	0.825	0.041	3.095
ICT service exports	30	8.595	4.809	1.138	19.327
Internet usage	31	6.627	7.874	0	25.533
Gross Capital Formation	31	19.241	2.631	15.004	24.951

Source: Author's own calculation

EMPIRICAL RESULTS

Table 2. ADF Unit Root Test Results

Variables	Testing level	Test statistic	Critical value (5%)	Integration Order
Log of GDP per capita	Level	0.059	-2.986	I (1)
	1st D	-4.165	-2.989	
Log of Health R&D	Level	0.115	-2.986	I (1)
	1st D	-4.156	-2.989	
Financial Development	Level	-1.732	-2.986	I (1)
	1st D	-6.209	-2.989	
Government expenditure on education	Level	-0.821	-3.000	I (1)
	1st D	-0.821	-3.000	
ICT service exports	Level	-1.231	-2.989	I (1)
	1st D	-5.330	-2.992	
Internet usage	Level	-2.091	-2.989	I (1)
	1st D	-5.886	-2.992	
FDI inflows	Level	-4.386	-2.986	I (0)
Gross Capital Formation	Level	-1.432	-2.986	I (1)
	1st D	-4.148	-2.989	

Source: Author's own calculation

EMPIRICAL RESULTS

Table 3. ARDL Bounds Test Results

	10%	5%	2.5%	1%
I (0) values	2.2	2.45	2.75	3.15
I (1) values	3.23	3.61	3.99	4.43
		F = 5.346		

Source: *Source: Author's own calculation*

Table 4. ARDL model Estimates on the Impact of research and Development on Economic Growth

	Dependet Variable: Log of GDP Per Capita	LR	SR
Error correction Terms (ECT) growth (annual %)		-0.044*** (0.012)	
Health R&D		4.727*** (0.027)	
Finacial Development		-0.003*** (0.001)	
Gov Expenditure on Education		-0.016*** (0.006)	
FDI inflows		-0.006 (0.004)	
ICT service exports		0.007*** (0.002)	
Internet usage		-0.013*** (0.004)	

EMPIRICAL
RESULTS

Table 4. ARDL model Estimates on the Impact of research and Development on Economic Growth

	Dependent Variable: Log of GDP Per Capita	LR	SR
Gross Capital Formation		0.002 (0.002)	
Health R&D			2.403*** (0.026)
Change in Finacial Development			0.0000672 (0.000)
Change in GOV Expenditure Education			-0.000319 (0.000)
Change in ICT Service_export			0.0000718 (0.000)
Changes in Gross Capital Formation			0.0000873 (0.000)
__cons			0.343*** (0.102)
_V	21		

EMPIRICAL RESULTS

Standard errors in parentheses
 * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

CONCLUSION



Health Research and development (R&D) is crucial to addressing complex challenges of modern global health and designing effective treatment and prevention approaches to address unique country's burden on Diseases, as well as emerging challenges like climate change.



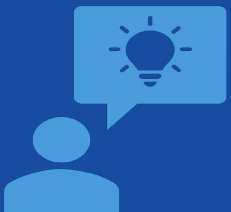
Every shilling invested in health R&D, the gross domestic product increases by Ksh 2.40 in the short run and Ksh 4.72 in long run.



The financial rate of return for health R&D is about 240 % in the short run and 472% in the long run estimated.



The implication of these findings is that additional resources should be earmarked for health R&D improvements.



Addressing the existing gap in empirical evidence regarding the impact of health R&D on economic growth, this analysis provides valuable insights that informs policy makers, and that health R&D are critical drivers of sustainable development and economic growth in Kenya and across the continent.



POLICY OPTION

- ❖ There is need to leverage on investments on health R&D to foster growth and innovation opportunities.
- ❖ Prioritizing financial inclusion in health R&D can also play a pivotal role in cultivating a vibrant and sustainable innovation environment in Kenya.
- ❖ This can be achieved by creating conducive environments through supportive policies, funding mechanisms, and infrastructure that promote entrepreneurship, research, and development across various sectors.



POLICY OPTION

- ❖ By investing in training initiatives that equip researchers, scientists, and healthcare professionals with advanced skills and knowledge, countries can cultivate a skilled workforce capable of addressing complex health challenges and driving cutting-edge research.
- ❖ Investing in infrastructure development is paramount for advancing medical science, improving healthcare outcomes, and addressing public health challenges effectively. This includes building cutting-edge research facilities, establishing robust data systems, and enhancing healthcare infrastructure to support innovation and progress in the healthcare sector.



POLICY OPTION

- ❖ Kenya could implement a range of export promotion strategies. These strategies encompass fostering international partnerships, conducting thorough market research to pinpoint export opportunities, tailoring products to meet the demands of export markets, ensuring adherence to quality standards and regulations, participating in trade missions and exhibitions, offering export financing and support, safeguarding intellectual property, accessing market assistance, cultivating brand identity, and investing in capacity building initiatives.



Thank you