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## Building Sustainable Funding Models: The Role of Private Sector Engagement in HIV/AIDS Research and Management in Africa

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#### **ABSTRACT**

The sustainability of HIV/AIDS research and management in Africa remains a critical challenge, particularly as traditional funding sources such as international donors and government allocations face financial constraints. This review explores the potential of private sector engagement as a complementary and sustainable funding model for HIV/AIDS programs across the continent. Key mechanisms of private sector involvement include corporate social responsibility (CSR) initiatives, public-private partnerships (PPPs), social impact investments, and health insurance schemes. Drawing on successful case studies, this study highlights the contributions of private enterprises in expanding access to treatment, enhancing healthcare infrastructure, supporting HIV/AIDS research, and integrating innovative financing mechanisms. The review also examines the challenges faced by private sector actors in engaging with HIV/AIDS programs and offers policy recommendations to strengthen collaborations between governments, international donors, and private entities. By leveraging financial resources, technological advancements, and operational efficiencies, private sector engagement can play a transformative role in bridging funding gaps and ensuring the long-term sustainability of HIV/AIDS interventions in Africa.

Keywords: HIV/AIDS funding, private sector engagement, corporate social responsibility (CSR).

### INTRODUCTION

HIV/AIDS remains one of the most pressing public health challenges in Africa, affecting millions of individuals and straining national healthcare systems [1]. Despite remarkable progress in reducing new infections and increasing access to antiretroviral therapy (ART), the epidemic continues to pose significant social, economic, and healthcare burdens [2]. The fight against HIV/AIDS has traditionally been funded through a combination of international donor support, domestic government allocations, and contributions from non-governmental organizations (NGOs) [3]. International initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the President's Emergency Plan for AIDS Relief (PEPFAR), and various United Nations (UN) agencies have played pivotal roles in financing prevention, treatment, and research efforts [4]. However, the sustainability of HIV/AIDS financing in Africa is increasingly uncertain due to financial constraints, shifting global priorities, and

donor fatigue. Against this backdrop, the private sector has emerged as a critical player in bridging funding gaps and ensuring the long-term sustainability of HIV/AIDS research, prevention, and treatment efforts [5]. Private sector engagement in healthcare financing encompasses a wide range of contributions, including direct investments, publicprivate partnerships, corporate social responsibility (CSR) initiatives, and innovative financial models [6]. By leveraging financial resources, technological expertise, and operational efficiencies, private sector involvement can complement public efforts and enhance the overall effectiveness of HIV/AIDS programs [7]. This review examines the role of in HIV/AIDS private sector engagement management in Africa, highlighting successful models and providing policy recommendations for enhancing private sector participation. HIV/AIDS epidemic has had a profound impact on Africa, with sub-Saharan Africa bearing the highest

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burden [8]. The region accounts for nearly 67% of the global HIV-positive population, with millions of individuals requiring lifelong care, treatment, and support. Over the years, international donors and governments have invested heavily in combating the epidemic, funding initiatives such as HIV prevention campaigns, ART distribution, and research into new treatment modalities [9]. However, economic downturns, political shifts, and competing global health priorities have led to a decline in donor funding, raising concerns about the sustainability of current HIV/AIDS programs. The traditional funding model, which relies predominantly on external aid, is becoming increasingly unsustainable [10]. Many African governments struggle to allocate sufficient domestic resources to health programs due to competing priorities such as infrastructure development, education, and security. Consequently, there is a growing need to explore alternative financing mechanisms to sustain and expand HIV/AIDS interventions [7]. The private sector has demonstrated potential in filling these financial gaps, not only through direct funding but also by supporting research, technology development, and service delivery innovations. Private enterprises, including pharmaceutical companies, healthcare providers, insurance firms, and technology firms, have increasingly shown interest in contributing to the fight against HIV/AIDS through various business-driven approaches and partnerships [11]. The current funding structures for HIV/AIDS programs in Africa are heavily reliant on external donors, which poses several challenges [7]. These include declining donor support, government budget limitations, inefficiencies in funding utilization, limited private sector involvement, and the need for innovative financing models. This study aims to assess and enhance private sector participation in HIV/AIDS financing by examining existing contributions, identifying best practices, and providing policy frameworks. The research questions cover the current sources of funding for HIV/AIDS programs in Africa, how private enterprises contribute to HIV/AIDS research, treatment, and prevention, challenges faced by private sector organizations when engaging in financing, the most effective and innovative financing models for sustaining HIV/AIDS programs, and policy recommendations for strengthening partnerships between governments, international donors, and private entities in HIV/AIDS funding [12]. The significance of this study lies in its potential to contribute to the sustainability of HIV/AIDS

programs in Africa through increased private sector involvement. The findings will be beneficial to multiple stakeholders, including governments, enterprises, healthcare policymakers, private providers, and international development agencies. Governments and policymakers can benefit from understanding policy frameworks that attract and incentivize private sector investments in HIV/AIDS programs, while private sector organizations can benefit from understanding successful models of involvement. International donors and development agencies can use this study to explore alternative funding mechanisms and identify strategic areas where private sector engagement can complement donor-funded initiatives. Healthcare providers and research institutions can benefit from increased private sector funding, as it can enhance research and innovation in HIV/AIDS treatment and prevention [13]. Communities and people living with HIV/AIDS can benefit from sustainable financing models that ensure continued access to life-saving treatments, prevention programs, and support services. By promoting private sector engagement, this study aims to enhance the long-term stability of HIV/AIDS interventions and improve health outcomes for affected populations. As global health financing evolves, it is crucial to explore new and sustainable mechanisms for funding HIV/AIDS programs in Africa. The private sector has the potential to play a transformative role in bridging funding gaps and ensuring long-term sustainability.

## The Current Landscape of HIV/AIDS Funding in Africa

HIV/AIDS remains a significant public health challenge in Africa, with millions living with the virus across the continent [1]. The response to this epidemic has been shaped by multiple funding sources, including international donor support, government contributions, and private sector engagement. The Global Fund is a key player in providing financial resources to combat HIV/AIDS, tuberculosis, and malaria, allocating significant resources to countries with the highest burden of HIV. PEPFAR, established by the U.S. government, is one of the largest HIV/AIDS programs globally, providing funding for HIV/AIDS prevention, treatment, and care services across Africa. UNAIDS and WHO are essential actors in coordinating and advocating for global HIV/AIDS funding, aligning resources and technical assistance for affected countries, and supporting the development of policies and strategies to fight the epidemic. Governments contribute to the funding of HIV/AIDS responses

through national health budgets, which account for a significant proportion of public health spending in many countries. However, the extent of government contributions varies widely, with countries like South Africa and Kenya investing heavily while others struggle to allocate sufficient resources [14]. Public health infrastructure investments are also being made to improve the delivery of HIV/AIDS services. Challenges in traditional funding mechanisms include decreasing donor commitment, economic constraints in African governments, and lack of long-term sustainability in HIV/AIDS programs. Private sector engagement in HIV/AIDS funding has become increasingly important, with corporations like Anglo American and Coca-Cola integrating HIV/AIDS programs into their CSR strategies. These initiatives focus on providing healthcare services, promoting HIV awareness, supporting treatment programs, and improving access to medicines [15].

# Private Sector Engagement in HIV/AIDS Funding: Key Models

Private sector engagement in HIV/AIDS funding is crucial for expanding access to treatment, improving healthcare infrastructure, and ensuring sustainability. Key models include Corporate Social Responsibility (CSR) initiatives, Public-Private Partnerships (PPPs), social impact investment and philanthropy, health insurance and employer-supported schemes [16]. CSR initiatives involve corporations integrating HIV/AIDS interventions into their social responsibility strategies, particularly in industries with large workforces or significant community influence [17]. Examples of CSR initiatives include Anglo American's Project Last Mile, Coca-Cola's Project Last Mile, and Public-Private Partnerships (PPPs). PPPs combine government oversight with private-sector efficiency to improve HIV/AIDS service delivery. Examples of PPPs in HIV/AIDS management include the Partnership for Supply Chain Management (PFSCM), Gilead Sciences' Partnerships, and the Global Health Investment Fund (GHIF). These partnerships help in scaling up treatment programs, improving supply chains, and reducing costs. Social impact investment and philanthropy focus on strategic investments in HIV/AIDS prevention, treatment, and research, often through philanthropic foundations and innovative financial tools [18]. Examples of private foundations supporting HIV/AIDS programs include the Bill & Melinda Gates Foundation, which funds groundbreaking research on HIV vaccines, microbicides, and PrEP, and the Clinton Health Access Initiative (CHAI), which works with

pharmaceutical companies to negotiate lower ART drug prices and expand HIV/AIDS diagnostic and treatment services in resource-limited settings. Health insurance and employer-supported schemes also enhance affordability and accessibility of HIV/AIDS services for workers. Some African countries, including South Africa and Kenya, have integrated HIV/AIDS treatment into private health insurance plans, ensuring that insured individuals can access essential HIV services without financial burden. Employer-based health programs like MTN Uganda provide ART, regular screenings, and workplace sensitization programs for employees, helping to reduce workplace stigma around HIV/AIDS. Private sector engagement HIV/AIDS funding plays a pivotal role in expanding improving healthcare access to treatment, infrastructure, and ensuring sustainability.

# The Impact of Private Sector Engagement in HIV/AIDS Research and Management

The private sector plays a crucial role in HIV/AIDS research, treatment, and prevention efforts. Pharmaceutical companies, such as Gilead Sciences, Johnson & Johnson, and ViiV Healthcare, are at the forefront of HIV/AIDS research, investing in new treatment regimens, prevention strategies, and potential cures [19]. They also fund clinical trials and collaborate with research institutions to accelerate drug discovery. Public-private collaborations have significantly advanced HIV vaccine research, such as the HIV Vaccine Trials Network (HVTN), which works closely with biotechnology companies, universities, and global health organizations to conduct large-scale clinical trials. Private sector engagement has also improved access to treatment and care by reducing ART costs through generic drug licensing agreements between major pharmaceutical firms and generic drug manufacturers. Companies in India and Africa produce lower-cost generic ART, expanding treatment access in low-income countries.

Technological innovations have revolutionized healthcare delivery through mPharma, optimizing ART supply chain management and improving treatment adherence and monitoring. Private companies also contribute to community-based HIV prevention programs by funding awareness campaigns, free testing programs, and educational initiatives. Telecommunication giants like MTN and Airtel support mobile health campaigns that disseminate HIV-related information via SMS and offer confidential testing services through mobile clinics [20]. Targeted interventions for high-risk

groups, such as sex workers, men who have sex with men (MSM), and intravenous drug users, have benefited from private sector funding. Businesses invest in community-based organizations providing prevention services, safe spaces, and legal advocacy. Strengthening these collaborations can further accelerate progress toward ending the HIV/AIDS epidemic.

# Barriers to Private Sector Engagement in HIV/AIDS Programs

The private sector plays a crucial role in strengthening healthcare systems and improving HIV/AIDS outcomes through innovation, funding, and service delivery. However, several barriers hinder its effective engagement in HIV/AIDS programs [21]. These include limited incentives for private sector investment in health, bureaucratic challenges in public-private partnerships (PPPs), financial and operational risks, ethical concerns, and limited awareness and coordination. Regulatory and policy constraints include limited incentives for private sector investment in health, bureaucratic challenges in PPP implementation, uncertain returns on investment for private firms, high initial capital requirements, and ethical concerns about profitdriven exploitation of HIV/AIDS patients. Private healthcare providers may charge high fees for HIVrelated services, making them inaccessible to lowincome populations, and pharmaceutical companies may engage in price manipulation of essential antiretroviral drugs, limiting affordability and access

Ethical concerns include the risk of reduced focus on vulnerable populations, as private firms may prefer serving insured or wealthier individuals rather than focusing on marginalized or high-risk groups who need HIV/AIDS services the most. Limited awareness and coordination between governments, private firms, and civil society organizations create challenges, such as lack of structured engagement between governments, private entities, and civil society, fragmented efforts, and duplication of resources. To overcome these barriers, targeted interventions, financial risk-sharing mechanisms, ethical safeguards, and stronger coordination frameworks are needed. Governments should streamline regulatory processes, create financial incentives for private firms, and establish transparent partnerships to encourage greater private sector engagement. Multi-stakeholder collaboration can enhance the effectiveness and sustainability of HIV/AIDS programs by aligning

private sector contributions with public health priorities.

### Policy Recommendations for Strengthening Private Sector Involvement

The policy recommendations for strengthening private sector involvement in HIV/AIDS programs include creating incentives for private investment, strengthening public-private partnerships (PPPs), and expanding innovative financing mechanisms. Governments should introduce tax deductions or credits for companies investing in HIV/AIDS prevention, treatment, and research, reduce import duties on essential medical supplies and pharmaceuticals, and subsidize healthcare costs for businesses that integrate HIV/AIDS programs into their employee benefits [23]. Corporate recognition programs should be established to recognize companies that demonstrate leadership in HIV/AIDS prevention and care, and include them in government contracts and partnerships as a reward for corporate social responsibility efforts in HIV/AIDS response. Governments should develop clear PPP policies that define roles, responsibilities, and expectations for private sector engagement in HIV/AIDS programs, align with broader public health goals, and use risksharing mechanisms to make private sector investments more attractive. Improving transparency and accountability in PPPs should be achieved through independent monitoring bodies, annual impact reports from private sector partners involved in HIV/AIDS programs, and public reporting platforms. Governments should also facilitate blended financing models that combine public, private, and donor funds for HIV/AIDS research, treatment, and prevention programs, and create tiered investment structures to ensure both large corporations and small businesses can contribute to HIV/AIDS financing [24]. Governments should mandate large employers to integrate HIV/AIDS care into employee health plans, encourage on-site health clinics, offer government incentives to companies implementing workplace HIV/AIDS policies and comprehensive employee wellness programs, and leverage mobile health technologies such as AI-driven and mobile-based monitoring tools to improve ART adherence. By implementing these policies, governments can foster stronger private sector engagement in the fight against HIV/AIDS, ensuring more sustainable, innovative, and inclusive health solutions.

### **Future Directions and Research Gaps**

The private sector's role in addressing HIV/AIDS has been significant, with initiatives focusing on

Corporate Social Responsibility (CSR), Public-Private Partnerships (PPPs), and social investments. However, there is a need to evaluate the long-term sustainability of these interventions [13]. Research could focus on comparative studies on CSR, PPPs, and social investments, as well as scaling up digital and telehealth interventions for HIV/AIDS management. AI, blockchain, and mobile apps are emerging as essential tools for HIV/AIDS management, particularly in underserved areas. AIdriven algorithms can assist in diagnosing HIV, predicting disease progression, and personalizing treatment. Blockchain technology can revolutionize HIV patient data storage and sharing, ensuring security, privacy, and transparency in treatment records. Mobile Health (mHealth) apps have the potential to revolutionize HIV management, particularly for individuals in remote or rural areas. Understanding the economic impact of private sector involvement in HIV/AIDS care is crucial for

Private sector engagement in HIV/AIDS research and management is vital for building sustainable, long-term funding models in Africa. Corporate social responsibility, public-private partnerships, impact investment, and employer-based health programs have significantly contributed to HIV/AIDS prevention and care. However, regulatory barriers, financial risks, and limited coordination remain

justifying long-term investments and policy decisions. A detailed cost-benefit analysis of private sector-driven HIV/AIDS programs is necessary, including comparing costs to benefits such as improved workforce productivity, reduced healthcare expenses, and decreased transmission rates. Longterm studies are needed to measure the ROI of private sector investments in HIV/AIDS programs, including metrics such as reduction in new HIV infections, increased access to treatment, and improved patient quality of life [25]. Addressing future research gaps will provide a clearer understanding of how private sector engagement can contribute to the fight against HIV/AIDS and ensure that interventions are sustainable, scalable, and economically viable. The role of digital health technologies, innovative partnerships, and economic evaluations will be crucial in designing effective, long-term HIV/AIDS management strategies.

#### **CONCLUSION**

challenges. Strengthening policy incentives, fostering transparent partnerships, and expanding innovative financing mechanisms can enhance private sector contributions. As global donor dependency declines, leveraging the private sector will be crucial for ensuring continued progress in HIV/AIDS control and eradication efforts across Africa.

#### REFERENCES

- Moyo, E., Moyo, P., Murewanhema, G., Mhango, M., Chitungo, I., Dzinamarira, T.: Key populations and Sub-Saharan Africa's HIV response. Front Public Health. 11, 1079990(2023). https://doi.org/10.3389/fpubh.2023.10799
  - https://doi.org/10.3389/fpubh.2023.10799 90
- Ugwu O P. C., Alum E. U., Obeagu E.I., Nwosu D.C. Adverse Drug Reactions in HIV/AIDS Patients on Highly Active Antiretro Viral Therapy: A Review of Prevalencenewport international journal of scientific and experimental sciences (NIJSES) 4(1),43-47(2023).
  - https://doi.org/10.59298/NIJSES/2023/1 0.6.1000
- 3. Angbalaga A, Ani C.C, Atsukwei D, Eze E. D, Afodun A.M, Igoh E. O, Owoeye S. C, Ukaonu C. B. Correlation of hepatobiliary ultrasonographic findings with cd4cell count and liver enzymes in adult HIV/AIDS

- patients in Jos. Journal of AIDS and HIV Research, 10, (6), 83-95 (2018).
- 4. Hanefeld, J.: The Global Fund to Fight AIDS, Tuberculosis and Malaria: 10 years on. Clin Med (Lond). 14, 54–57 (2014). https://doi.org/10.7861/clinmedicine.14-1-54
- 5. Bekker, L.-G., Alleyne, G., Baral, S., Cepeda, J., Daskalakis, D., Dowdy, D., Dybul, M., Eholie, S., Esom, K., Garnett, G., Grimsrud, A., Hakim, J., Havlir, D., Isbell, M.T., Johnson, L., Kamarulzaman, A., Kasaie, P., Kazatchkine, M., Kilonzo, N., Klag, M., Klein, M., Lewin, S.R., Luo, C., Makofane, K., Martin, N.K., Mayer, K., Millett, G., Ntusi, N., Pace, L., Pike, C., Piot, P., Pozniak, A., Quinn, T.C., Rockstroh, J., Ratevosian, J., Ryan, O., Sippel, S., Spire, B., Soucat, A., Starrs, A., Strathdee, S.A., Thomson, N., Vella, S., Schechter, M., Vickerman, P., Weir, B., Beyrer, C.: Advancing global health and strengthening the HIV response

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- in the era of the Sustainable Development Goals: the International AIDS Society— Lancet Commission. Lancet. 392, 312–358 (2018). https://doi.org/10.1016/S0140-6736(18)31070-5
- Hallo De Wolf, A., Toebes, B.: Assessing Private Sector Involvement in Health Care and Universal Health Coverage in Light of the Right to Health. Health Hum Rights. 18, 79–92 (2016)
- Alum EU, Obeagu EI, Ugwu OPC, Egba SI, Ejim Uti DE, Ukaidi CUA, Echegu DA. Confronting Dual Challenges: Substance Abuse and HIV/AIDS. Elite Journal of HIV, 2(5):1-8(2024). https://epjournals.com/journals/EJHIV
- 8. Kharsany, A.B.M., Karim, Q.A.: HIV Infection and AIDS in Sub-Saharan Africa: Current Status, Challenges and Opportunities. Open AIDS J. 10, 34–48 (2016). https://doi.org/10.2174/187461360161001
- 9. Franck K. S., Sonye M. K, Robert M, Robinson S. Alobar Holoprosencephaly with Cebocephaly in a Neonate Born to an HIV-Positive Mother in Eastern Uganda. Case Reports in Otolaryngology, (1), 7282283 (2021).

0034

- https://doi.org/10.1155/2021/7282283
- Zhang, Y., Yu, X., Zhang, H.: Addressing the Insufficiencies of the Traditional Development Aid Model by Utilizing the One Belt, One Road Initiative to Sustain Development in Afghanistan. Sustainability. 11,312(2019).
  - https://doi.org/10.3390/su11020312
- 11. Ebulue, C.C., Ebulue, O.R., Ekesiobi, C.S.: Public-Private Partnerships in Health Sector Innovation: Lessons from Around the World. International Medical Science Research Journal. 4, 484–499 (2024). https://doi.org/10.51594/imsrj.v4i4.1051
- Mugisha S, Agwu E. Cross-border movement of people and its effect on the Spread of HIV/AIDS in Kisoro district south western Uganda. Special viral Pathogens Journal, 1, (1), 0026-0037 (2015).
- 13. Shrivastava, R., Fonjungo, P.N., Kebede, Y., Bhimaraj, R., Zavahir, S., Mwangi, C., Gadde, R., Alexander, H., Riley, P.L., Kim, A., Nkengasong, J.N.: Role of public-private partnerships in achieving UNAIDS HIV

- treatment targets. BMC Health Serv Res. 19,46(2019).
- https://doi.org/10.1186/s12913-018-3744-
- 14. Winchester, M.S., King, B., Rishworth, A.: "It's not enough:" Local experiences of social grants, economic precarity, and health inequity in Mpumalanga, South Africa. Wellbeing, Space and Society. 2, 100044 (2021).
  - https://doi.org/10.1016/j.wss.2021.100044
- Obeagu, E. I., Nwosu, D. C., Ugwu, O. P. C. and Alum, E. U. Adverse Drug Reactions in HIV/AIDS patients on highly active antiretro viral therapy: a review of prevalence. Newport international journal of scientific and experimental sciences (NIJSES). 4(1):43-47 (2023). https://doi.org/10.59298/NIJSES/2023/10.6.1000
- Ramiah, I., Reich, M.R.: Building effective public-private partnerships: Experiences and lessons from the African Comprehensive HIV/AIDS Partnerships (ACHAP). Social Science & Medicine. 63, 397–408 (2006). https://doi.org/10.1016/j.socscimed.2006.0 1.007
- Opoku Marfo, E.: Mechanisms and initiatives of corporate social responsibility behaviours in Ghana: a co-integration approach. Cogent Business & Management. 11,2312580(2024). https://doi.org/10.1080/23311975.2024.23 12580
- Atun, R., Silva, S., Ncube, M., Vassall, A.: Innovative financing for HIV response in sub–Saharan Africa. J Glob Health. 6, 010407(2022). https://doi.org/10.7189/jogh.06.010407
- Tatoud, R., Brander, C., Hwang, C., Kennelly, J., Lu, S., O'Neil, K., Safrit, J.T., Benhayoun, I., Firmat, J., Barriere, N.: Biotech's role in advancing HIV vaccine development. Emerging Microbes & Infections. 13, 2384460 (2024). https://doi.org/10.1080/22221751.2024.23 84460
- 20. Kreniske, P., Namuyaba, O.I., Kasumba, R., Namatovu, P., Ssewamala, F., Wingood, G., Wei, Y., Ybarra, M.L., Oloya, C., Tindyebwa, C., Ntulo, C., Mujune, V., Chang, L.W., Mellins, C.A., Santelli, J.S.: Mobile Phone Technology for Preventing

- HIV and Related Youth Health Problems, Sexual Health, Mental Health, and Substance Use Problems in Southwest Uganda (Youth Health SMS): Protocol for a Pilot Randomized Controlled Trial. JMIR Res Protoc. 12, e49352 (2023). https://doi.org/10.2196/49352
- 21. Emeka G A., Chioma L O. Does plantar lipoatrophy affect dynamic balance in HIV infected persons? Gait & Posture, 86, 101-105(2021). https://doi.org/10.1016/j.gaitpost.2021.02.01
- 22. Alum, E. U, Uti D. E, Ugwu, O. P. C., Alum B. N., Toward a cure Advancing HIV/AIDs treatment modalities beyond antiretroviral therapy: A Review. Medicine 103(27):p e38768, (2024). | DOI: 10.1097/MD.0000000000038768

- 23. Thirumurthy, H., Galárraga, O., Larson, B., Rosen, S.: HIV Treatment Produces Economic Returns Through Increased Work and Education, And Warrants Continued US Support. Health Aff (Millwood). 31, 1470–1477 (2012). https://doi.org/10.1377/hlthaff.2012.0217
- 24. Katz, I., Routh, S., Bitran, R., Hulme, A., Avila, C.: Where will the money come from? Alternative mechanisms to HIV donor funding. BMC Public Health. 14, 956 (2014). https://doi.org/10.1186/1471-2458-14-956

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