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Pharmaceutical Manufacturing & Industry Capacity Building in South Africa

Prepared by MMH & Partners, Africa (Pty) Ltd

November 2023

Prepared for the **Presidency of the Republic of South Africa** and the **National Department of Health**, at the request of the Office of the Director General of the Department of Health, by Michael Mynhardt[1]

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1. Executive Summary: RSA to Spearhead New Public Health Order for Africa

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This position paper offers the Presidency and the Department of Health (DOH) with invaluable industry insights by MMH & Partners, Africa (Pty) Ltd, towards achieving a new public health order for Africa based on the following six strategic objectives:

1. ***Meeting the 95-95-95 UNAIDS targets in South Africa***

2. ***Building and supporting the efforts of 5 API manufacturers in South Africa by 2030***

3. ***Securing the African continent's capacity to locally manufacture 60% of the vaccines it requires for its growing population base by 2040***

4. ***Ensuring that 30% of all public procurement in RSA be allocated to local manufacturers with the capacity to produce all healthcare products (including medical devices, consumables, pharmaceuticals, vaccines, injectables and biologics)***

5. ***Allocating 1% of RSA's GDP towards research, intellectual property development, product discovery and innovation for the healthcare sector***

6. ***Securing SAHPRA's status as a WHO Listed Authority (WLA), under a new, globally recognized regulatory standard that will provide local pharmaceutical manufacturers in South Africa with the regulatory means to improve and expedite their access to the donor-funded market***

An executive summary of our strategic recommendations is available below.

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2. Strategic Recommendations to the Presidency of the Republic of South Africa:

The African continent, and the people who live in South Africa, deserve access to improved vaccine-supply and medicine security. Citizens in our country should rest assured in the fact that the Republic of South Africa (RSA) has strengthened its pandemic preparedness, and has improved its ability to tackle endemic diseases, in a countrywide effort to spearhead the development of a new public health order for Africa in the next 5-15 years.

This critical undertaking is currently being led, in part, by the Partnerships for African Vaccine Manufacturing Framework for Action (PAVM FFA). With the RSA's continued support, the PAVM could meet its ambitious goal of ensuring that 60% of Africa's vaccine demand is supplied by Africa's own vaccine-manufacturing industry by 2040.

The Afrigen mRNA vaccine technology hub in Cape Town offers a key towards making this possible in RSA. If we continue to develop the technology to manufacture biologics locally, as well as mRNA based products on our continent, South Africa can position itself at the forefront of the development of a pharmaceutical manufacturing framework for improved medicine supply across Africa in the long term.

In order to achieve medicine supply at this level, the Presidency and Department of Health (DOH) must allocate 1% of RSA's GDP towards research, intellectual property development, product discovery and innovation in the healthcare sector. Both public entities must also offer their unconditional support and assistance to South African scientists with the resources they require to develop their own intellectual property rights for active pharmaceutical ingredients (API) and drug substances in our country.

This will remain a critical undertaking if we want to manufacture both on a commercial scale in South Africa. Only then will we be able to build an end-to-end manufacturing framework that works on the continent. Currently, the industry is based on fill and finish operations alone. This is not strategic or economically sustainable over the long term, and poses a severe risk to our country's medicine security.

To date, local manufacturers have remained at a competitive disadvantage when it comes to APIs, due to a number of different market forces that have included poor and inefficient production value chains, the high cost of production of medicines and vaccines, as well as poor financing and financing models. Thankfully, a number of international organisations and Development Finance Institutions (DFIs) have heeded the call to improve these circumstances, paving the way for the development of South Africa's pharmaceutical and vaccine manufacturing framework. The time to leverage these opportunities is now.

Ensuring our country's improved capacity to produce medicine and vaccines locally will also remain a critical undertaking if we want to improve the lives of those living with HIV at the global epicentre of the virus. In order to do so, we must decrease our reliance on foreign pharmaceutical imports and develop a sustainable, pharmaceutical manufacturing framework that will remain dedicated to securing Africa's supply of life-saving ARVs over the long-term.

The Joint United Nations Program on HIV/AIDS (UNAIDS) "95-95-95" targets call for 95% of people living with HIV to be aware of their status, 95% of those aware of their status to be on antiretroviral therapy (ART), and 95% of those on ART to achieve viral load suppression. Investing (locally) in healthcare facilities with the

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capacity to manufacture the drug substances and APIs associated with ARV and PrEP treatments will remain a significant undertaking to help South Africa meet these targets, while making medication more affordable and improving security of supply in emerging markets across the continent today.

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3. Contraction in Manufacturing Activity in South Africa

The seasonally adjusted Absa Purchasing Managers' Index fell to 45.4 in October 2023 from an upwardly revised 46.2 in September, indicating the ninth consecutive month of contraction in South Africa's factory activity, despite the reduction in the frequency and intensity of load-shedding. This is problematic as our manufacturing output is inching further below the 50-point mark, indicating a marked contraction as opposed to the expansion we so desperately require to keep the gears of our economy turning.

National government must not ignore the dangers of a declining manufacturing output. There is little sustainability or business confidence in any market economy without the growth that accompanies the production and sale of goods through its manufacturing sector. This negative outlook is only compounded further by a national energy crisis that continues to thwart our potential or perceived growth in future.

Three large pharmaceutical manufacturing businesses in Cape Town have been affected by this downturn - with one firm retrenching up to 50% of its staff to simply keep its doors open. This sets a poor precedent for a sector that currently provides up to 20% of formal sector employment opportunities in our country.

As such, we must enable the sustainable growth and expansion of the sector if we want it to continue creating jobs for South Africans in need of work. To make this possible in manufacturing, we need to incentivize investment into the capacity building of the industry with new factories, improve regulatory support for different streams in the sector, increase the rate of skills and technology transfers from players overseas while improving public procurement processes with sound off-take agreements.

In terms of regulatory support, our government can provide the manufacturing sector with the financial support they need through tax-friendly incentives. This would help create a more enabling environment for the expansion of the sector - consider vastly improved tax rebates or concessions for solar installations at factories committed to our country's transition to renewable energy.

Regulatory support must also come from larger, industry-specific bodies operating across Africa. Consider the pharmaceutical manufacturing sector in South Africa, and the Africa Centers for Disease Control and Prevention (CDC). Africa CDC should be leveraged to promote the mutual recognition of local manufacturers to lower the barriers to entry to new markets across the continent. The African Medicines Agency (AMA) is already in pursuit of this goal, by incentivizing local pharmaceutical production processes in Africa. This will be a critical undertaking to help prevent the contraction of pharmaceutical industries across Africa, while enabling their expansion and growth.

That being said, we must continue to improve the technology and skills transfer from players overseas if we don't want manufacturing to fall behind. Local manufacturers require technical support from larger, international companies and foundations through skill transfers in manufacturing, to continue meeting the highest global standards, to adopt the latest in global best practice and towards improving the efficacy and management of all internal processes.

Local manufacturers in South Africa should also secure preferential treatment in terms of public and private market procurement.

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The DOH should ensure that 30% of public procurement in RSA be allocated to local manufacturers with the capacity to produce all healthcare products (including medical devices, consumables, pharmaceuticals, vaccines, injectables and biologics). If these off-take agreements are secured successfully, local manufacturers can improve their access to additional funding as their business entities will carry far less risk.

MMH & Partners recommends that the RSA government motivate donor funders, including PEPFAR and the Global Fund to allocate 30% of their procurement agreements to local pharmaceutical manufacturers based in South Africa as well.

It is clear that government should not make any healthcare procurement decisions based on the price tag alone – as imported goods will certainly be less costly to those produced locally. In such cases, the public sector must consider the imported price against the economic multiplier effect. If contracts are awarded to local manufacturers, it results in improved job creation, a secure supply of medicine, an increasing rate of skill transfers and development, economic stimulation and higher levels of investment into the South African economy.

One thing is clear - we cannot simply focus on reversing nine months of successive contractions in our manufacturing sector. Our approach to address this trend must include a plan, and vision, that makes sustainable provisions for the growth and expansion of our own healthcare products in future as well.

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4. **Expansion Of Pharmaceutical Manufacturing Industries Critical to Strengthen African Health Systems & Decrease Reliance on Foreign Imports**

Distribution & Accessibility

In Africa, 99% of all vaccines administered to people are imported. The consequences of this are notably concerning - and became painfully evident after COVID-19. African countries were left last in line to receive their shots, with foreign vaccine manufacturers controlling their distribution based on their preferred commercial agreements.

This meant that affluent countries - where vaccines were being made — received their vaccines first, simply because they could pay more. Sadly, this is not the first time that Africa and its people have been excluded from the latest developments in healthcare and vaccine technology. It will be a regretful recurrence if we don't focus on expanding our capacity to manufacture them ourselves, today.

Navigating Capital Expenditure to Strengthen Africa's Healthcare Systems

The start-up costs for any manufacturing plant are significant - to simply set-up a respectable tablet or capsule manufacturing facility, you're looking at a minimum spend of R50+ million. For vaccines, that number balloons in excess of R600m+. This constitutes a material capital outlay to simply lay the groundwork, and it does not include any additional costs or fees associated with the manufacturing of healthcare products in Africa.

Research and development, intellectual property rights, clinical trials and the registration of products will immediately add to these figures. The actual manufacture, distribution and education associated with the product only compounds the final amount. Medical devices, pharmaceutical products and biologics must each have their own production facility as well - with a number of strict controls to prevent the contamination of the products being manufactured.

Improving Standards of Healthcare

The African continent, and the people who live here, deserve access to improved vaccine-supply security. Citizens across Africa should rest assured in the fact that we have strengthened our pandemic preparedness, and have improved our ability to tackle endemic diseases.

This incredible undertaking is already being led by the Partnerships for African Vaccine Manufacturing Framework for Action (PAVM FFA), which, with our continued support, will certainly result in success. The PAVM has already set itself an ambitious goal, towards ensuring that 60% of Africa's vaccine demand is supplied by Africa's own vaccine-manufacturing industry by 2040.

Vertical over Horizontal Integration is Key

If we are to meaningfully tackle the expansion of our manufacturing capabilities, we cannot ignore the need to ensure vertical integration in the healthcare manufacturing sector. If we are not able to control the entire manufacturing process, then all we will achieve is a number of fill and finish facilities.

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This means that we need to empower players in the sector with the regulatory and financial support they require to become innovators, with their own research and development, to ensure they have sole control of the intellectual property of their products ahead of any clinical trials.

This support must remain in effect across all four stages of clinical trials, until there is a proven claim regarding the efficacy of the product being manufactured. Once manufacturers reach the regulatory space, we need to ensure that the local authorities (i.e, SAHPRA) create an enabling environment with quick turnaround times for the registration of pharmaceuticals and biologics. If entities like SAHPRA can expedite the licensing of plants and product registrations in a manner that is both efficient and timeous, local manufacturers will decrease their time to market and citizens will have improved access to healthcare, faster than ever before.

Improve Market Access through Regulatory Harmonization

We must also prioritize and improve market access through regulatory harmonization, the process by which technical guidelines are developed to be uniform across participating authorities. This mutual recognition would be required among the different regional regulatory authorities if we want locally manufactured healthcare products to be distributed across all five regions in Africa, without disruption. Ultimately, we want this to lead to regulatory convergence, where regulatory requirements across countries or regions become more similar over time as a result of the gradual adoption of internationally recognized technical guidance documents, standards and scientific principles.

Regulatory harmonization must be met with the capacity to distribute healthcare products quickly, at speed, with a well-established supply chain. Securing significant momentum across supply chains cannot be overstated - in Africa, pace can trump perfection. The estimated increase of our population figures may cause exponential spikes in our collective infection rate - in such an event, even a single disruption to our pharmaceutical manufacturing supply chain could be catastrophic.

Case Studies for Success

The world-renowned Afrigen Biologics mRNA hub in Cape Town already aims to contribute significantly to our continental independence, by working on the development of new vaccines for diseases that are rampant in lower and middle-income countries.

The first vials should be making their way to the market by 2024. What makes Afrigen a particularly valuable case study, is that they're willing to transfer their knowledge with a number of selected manufacturers in Africa as well. Afrigen's Pan-Africanist approach to decreasing Africa's reliance on foreign imports will help put South Africa at the forefront of this remarkable undertaking over the next 5-10 years.

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5. Pharmaceutical Manufacturing Plan for Africa is Critical for Pandemic Preparedness, Prevention & Response

The 12th International Aids Society Conference on HIV Science was recently held in Brisbane, Australia, featuring a number of studies that have come to represent several important advances in HIV prevention, treatment and cure research (July 2023). The conference offered the World Health Organisation (WHO) an opportunity to announce that there is negligible, or almost zero risk of transmitting HIV when a person has an HIV viral load measurement of less than or equal to 1000 viral load copies per mL, commonly referred to as having a suppressed viral load.

The evidence presented by the latest advancements in WHO's scientific research on HIV viral suppression confirms that people living with HIV (PLWH) who achieve and maintain an undetectable level of the virus through the consistent use of antiretroviral (ARV) therapy do not transmit HIV to their sexual partner(s) and are at low risk of transmitting HIV vertically to their children.

Meeting UNAIDS 95-95-95 Targets in Africa

These findings have underscored the significance of meeting the Joint United Nations Program on HIV/AIDS (UNAIDS) "95-95-95" targets, which call for 95% of people living with HIV to be aware of their status, 95% of those aware of their status to be on antiretroviral therapy (ART), and 95% of those on ART to achieve viral load suppression.

Achieving these targets across the African continent will remain a critical undertaking if we want to improve the lives of those living with HIV at the global epicentre of the virus. According to UNAIDS 2023 epidemiological estimates, over 65% of the global population living with HIV are based in eastern, southern, western and central Africa, with a collective 25.6 million infections as of 2022. Sadly, all four regions are yet to meet these targets. In the middle east and northern Africa alone, only 50% of people living with HIV are currently on ARTs, increasing the risk of transmission and rate of infection on the continent.

Thankfully, a number of countries have already met their 95-95-95 targets, including Botswana, Eswatini, Rwanda, the United Republic of Tanzania and Zimbabwe. Their commitment and dedication to this campaign offers a useful blueprint for other African countries that aspire to achieve the same targets in the long-term.

Capacitate Local Production of Pharmaceutical Products to Prevent, Detect, Treat Virus

The Presidency of RSA and its DOH should be incentivized by WHO's scientific research and findings to offer a world-leading response to this crisis, by significantly decreasing our reliance on foreign pharmaceutical imports and capacitating local manufacturers with the resources they need to produce life-saving ARVs dedicated to securing Africa's supply over the long-term. A dedicated approach to this strategy will empower all African countries to meet their 95-95-95 targets.

Decrease Reliance on Foreign Imports for PLWH & Pandemic Preparedness

At present, between 80-90% of global HIV, Tuberculosis and Malaria cases occur on the African continent, and yet, we import ~80% of the drugs required to address these health risks.

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A large portion of this medication is funded by international donors at an estimated US$14 billion a year. In 2012, the Pharmaceutical Manufacturing Plan for Africa (PMPA) proposed an initial budgetary allocation of US$54 million for the manufacture of medicinal drugs over the next 5 years. Sadly, the funding did not materialize**.** Today, global interest to invest in Africa's call to establish a strong, quality-assured, locally-based pharmaceutical manufacturing sector is gaining momentum. The time has come to accelerate its implementation.

Nothing could be more critical to help improve our medicine supply, security and pandemic preparedness for future generations.

Manufacturing APIs & Drug Substances in South Africa

In order to achieve medicine supply at this level, South African scientists must be supported to develop their own intellectual property for healthcare products, including APIs and other drug substances. Only then will we be able to build an end-to-end manufacturing framework that works on the continent. Currently, the industry is based on fill and finish operations alone. This is not strategic or economically sustainable over the long term.

In fact, we must also redouble our efforts in capacity-building, knowledge transfers, cross-sector coordination, and ensure the rigorous implementation of the AfCFTA. This will be paramount to further mobilize financial resources from international financial institutions and development banks, while encouraging cross-country collaboration to strengthen human capital funding.

Pan-African Approach to Medicine Supply

The PAVM offers a leading example of how we might take a pan-African approach towards developing significant convening power and technical capabilities to galvanize global and regional partners towards building Africa's regulatory capacity, technical partnerships and vaccine procurement pooling mechanisms.

The PAVM recently formalized a sustainable ecosystem of action-oriented partners in support of achieving the African Union's (AU) vision of 60% locally produced vaccines by 2040.

To support the PAVM's vision for 2040 and the bankability of this project, the African Development Bank is implementing a flagship program in support of local vaccine manufacturing in line with its 2030 Vision for the Development of Africa's Pharmaceutical Industry and the 2040 AU/African CDC vision for increased local vaccine manufacturing.

Access to Funding Available for Pharmaceutical Manufacturing Expansion in Africa

The Access to COVID-19 Tools Accelerator (ACT-A) was an unprecedented global coordination mechanism that was co-chaired by South Africa and Norway and raised US$24 billion, for the distribution of vaccines, diagnostics, therapeutics and personal protective equipment.

Notwithstanding its phenomenal success, there were a number of serious pitfalls that could cost people their lives: it took too long to raise the financing, while vaccine deployment was delayed by issues of export bans and other geopolitical tensions.

The diagnostics and therapeutics pillars did not meet their targets and the health systems connector pillar did not operationalise adequately and failed to meet its mandate, compromising critical last-mile capabilities.

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Successful Case Studies: TEI Large-Scale Investment for Vaccine Production in Senegal

The Team Europe Initiative (TEI) on manufacturing and access to vaccines, medicines and health technologies in Africa may offer one of the most successful case studies to date. TEI recently agreed to support a large-scale investment in vaccine production by the Institut Pasteur in Dakar, Senegal. Their commitment to this undertaking has been rolled out alongside other support measures to reduce Africa's 99% dependence on vaccine imports and to strengthen future pandemic resilience on the continent.

The TEI MAV+ also aims to increase equitable access to safe, effective, quality and affordable essential vaccines, medicines and health technologies for all Africans. It follows a 360-degree approach to ensure supply and demand within an enabling environment that is underpinned by six work streams, namely industrial development (supply chains and private sector), market shaping (demand and trade facilitation), regulatory strengthening, technology transfers and intellectual property management, access to finance as well as research and development (in terms of higher education and skills).

Manufacturing PrEP in South Africa

PrEP, or pre-exposure prophylaxis, describes the use of medications to prevent the spread of disease in people who have not yet been exposed to a disease-causing agent, usually a virus. By investing in the development of advanced HIV technology in Africa with a locally-based manufacturing framework for a vertically integrated ecosystem, we could begin to manufacture PrEP locally, for people who don't have HIV and are at risk of being infected.

South Africa's present capacity to manufacture PrEP tablets remains negligible at best, and should be improved. That being said, our vision to ensure long-term medicine security should focus on the production of biologics instead. PrEP tablets need to be taken once daily, ideally at the same time of day. This daily adherence is essential to maintaining its effectiveness, and any deviation from it could result in infection. The tablets have also been documented to cause a number of side effects, including diarrhea, nausea, headache, fatigue and stomach pain.

Given the risk of infection and daily adherence, injectable PrEP with cabotegravir (CAB) offers a highly effective alternative to protect adults and adolescents who are at risk of contracting HIV through sex. While Cipla has announced plans to manufacture these at two of their plants in South Africa, a production date is yet to be confirmed.

Investing (locally) in healthcare production facilities with the capacity to manufacture rapid diagnostic tests (RDTs), APIs, drug-substance, tablets and injectables will remain a significant undertaking to help make essential healthcare products more affordable in emerging markets across the continent today.

mRNA vaccine technology is at the very forefront of making this possible. If we can develop the technology and drug substances to manufacture PrEP locally, as well as mRNA-based products on our continent, South Africa can position itself at the forefront of the development of innovative products and a healthcare manufacturing framework for improved medicine supply across Africa in the long term.

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6. Infrastructure Development for Success

Public Infrastructure for Improved Supply Chain Efficiency & Market Access

South Africa's public infrastructure, in terms of its national energy crisis and regular potholes, leave much to be desired. If we want our production facilities to get to market efficiently, we must improve our factory's access to electricity, improve public transportation on our roads, have access to clean water and can leverage the fast-tracking of healthcare products as exports at our borders and ports.

Incentivizing Capital Inflows for the Development of Production Facilities

South Africa needs to build capacity if it wants to increase the output of its pharmaceutical manufacturing sector. In order to accomplish that, we need to incentivize capital investments into the industry. This capital inflow will remain far more likely if we focus on 4 key strategic areas, with subsequent timelines for their implementation.

These include regulatory harmonization, preferential regulatory support for local facilities and far better turnaround times for licensing facilities and new product registrations. This must be complemented by sound off takes from public procurement agencies and donor funders at preferential rates (or price premiums) for the next 3-5 years.

Lastly, and perhaps most critically relevant to South Africa, would be to secure supply chain improvements for the effective delivery of medicine in the region (not just within the country).

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7. Regulatory Authority Standardisation

Industry experts at the World Local Production Forum (WLPF) in The Hague, Netherlands, recently confirmed (November 2023) the urgent need to address the regulatory challenges affecting the equitable access to medicine and healthcare products in Africa today.

Citing conditions affecting the development of Africa's new public health order, it was agreed that a global regulatory standard would remain a critical undertaking to decrease Africa's reliance on foreign healthcare products and imports.

At present, pharmaceutical manufacturers based on the continent have faced major regulatory challenges to supply international donor funders, ultimately limiting their growth and ability to support demand in their region. This is due to donor funders insisting on regulatory standards that differ from those of the regional authorities.

A Globally Recognised Regulatory Standard

Having a globally recognised regulatory standard would provide local pharmaceutical manufacturers in Africa with a unilateral standard that may expedite their access to the donor-funded market. This instrumental undertaking would assist local producers with the compliance required to supply institutions like the Global Fund and PEPFAR, within the next 6 months.

Industry experts at the WLPF believe that we can use the Global Benchmarking Tool to measure the maturity level of different regulatory authorities, in order to assess their ability to qualify as a WHO Listed Authorities (WLAs). At present, only 3 countries have WLA status, including the Republic of Korea, Singapore and Switzerland. It is suggested that WLA status be adopted by donor funders as an acceptable pre-requisite for procurement.

As such, all regulatory authorities in Africa with a maturity level 3 or 4, including South Africa and SAHPRA, should be recognised as a WHO Listed Authority (WLA) without delay.

WLA Status Key to Unlock Significant Resources

With WLA status, local pharmaceutical manufacturers would be able to supply donor funders and ultimately unlock significant resources ring-fenced by DFI's for the manufacture of healthcare products in Africa, and South Africa as well.

With access to appropriate funding, and sound off-take agreements from donor funders and the public sector, local manufacturers can build sustainable business models to ensure the long-term production of medicines and vaccines in Africa, for Africa.

The Federation of African Pharmaceutical Manufacturers Associations (FAPMA) supports this initiative and recently called on the Global Fund and US government to procure 30% of their products from African manufacturers, over the next 3-5 years, at a 15-20% price premium.

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If we can recognise WLA status as our new global regulatory standard, manufacturers based in Africa can mobilise the resources made available by international financial institutions and development banks, towards playing an indelible role in securing a new public health order for Africa.

This would ensure our collective and continued, sustainable and equitable access to medicine and vaccines in Africa, improving our pandemic preparedness while significantly decreasing our reliance on foreign imports.

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8. The Crucial Role of Human Capital Development in Pharmaceutical Manufacturing

The African Union's Bio-manufacturing Workforce Development Workshop Report 2023 and the United Nations Economic Development in Africa Report 2023 spotlight the critical role of a skilled and adaptable workforce.

Cross Training and Skills Assessment

Cross training emerges as a pivotal strategy in an industry as dynamic as pharmaceutical manufacturing. It not only ensures the adaptability and versatility of the workforce but also reinforces the sector's resilience. A workforce skilled in multiple facets of pharmaceutical manufacturing can seamlessly adapt to changing roles and evolving industry standards.

Technology Adoption: Catalysing Innovation

In the 21st century, pharmaceutical manufacturing is inseparable from cutting-edge technology. The African Union's Bio-manufacturing Workforce Development Workshop Report and the United Nations Economic Development in Africa Report emphasise the critical role of technology adoption. South Africa's pharmaceutical manufacturing sector must embrace technological innovations to enhance efficiency, quality, and compliance.

African Skilled Labour Force: Catalyst for Research & Development

A skilled labour force in South Africa will create an enabling environment for research and development and product discovery of new medicines that can benefit Africa. The continent's unique challenges and healthcare needs necessitate a workforce intimately familiar with the local context.

The commitment of BRICS member states, Africa CDC, and WHO to collaborate with the business sector on pandemic prevention, preparedness, and response underscores the relevance of a skilled workforce in addressing healthcare crises.

A workforce rooted in Africa, and South Africa’s realities will be better equipped to drive research and development initiatives that address the continent's specific healthcare challenges.

Challenges and Opportunities

Developing a skilled pharmaceutical manufacturing workforce in Africa faces challenges, notably resource constraints hindering investment in education and training.

Brain drain, where skilled professionals migrate for better opportunities, necessitates retention strategies emphasised by BRICS member states, Africa CDC, and WHO collaboration. Overcoming complex regulatory environments involves simplifying processes and promoting transparency, fostering investment and growth.

Despite limited research funding, collaboration commitments underscore the importance of allocating resources for pharmaceutical sciences. Access to cutting-edge infrastructure and technology, highlighted in a partnership case study, showcases how collaborations can bridge gaps, ensuring Africa's pharmaceutical manufacturing sector thrives globally.

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The Way Forward: A Resilient Future

The healthcare challenges in Africa present a unique opportunity for growth and development by investing in human capital. This strategic approach not only reduces dependence on imported pharmaceuticals but also stimulates economic growth and enhances healthcare access.

The collaborative efforts showcased in reports such as the African Union's Bio-manufacturing Workforce Development Workshop Report 2023, the United Nations Economic Development in Africa Report 2023, and the commitments of BRICS member states, Africa CDC, and WHO emphasize the collective responsibility to pursue this path. Investing in human capital is not merely an obligation but a transformative opportunity to empower individuals, drive economic prosperity, and build a healthier future for Africa.

The successful collaboration between educational institutions and private sector companies could serve as a model for seizing opportunities and advancing Africa's pharmaceutical manufacturing sector. The outlined vision in the Framework for Action propels the continent towards a future where collaboration and innovation are the pillars of a resilient and self-sufficient pharmaceutical industry.

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9. Framework To Improve Diagnostic Testing And Screening Critical

Estimates from the Africa Center for Disease Control and Prevention (Africa CDC) indicate that our continent's population growth is set to pass the 4 billion mark in the next 50 years. This figure plays an important role in terms of our capacity to prevent and contain any viral outbreaks, especially when urbanization continues to increase at an exponential rate. Data from the Africa CDC indicates that by 2030, the number of people living in urban areas will exceed those in rural ones.

We can make two assumptions based on these insights - first, we are going to see a notable uptick in the number of new diseases in our cities, and, we are going to need a sustainable, data-driven approach to manage outbreaks in those highly populated urban areas.

Regular Testing & Data-Driven Decision-Making

Without regular testing, the statistical analysis of the spread of the outbreak will remain inaccurate at best. In fact, whatever stats we have today for all major critical diseases on the continent are probably understated as well. With access to data in real time, we can improve our response to the infection rate, because we know how quickly it is being transmitted on the ground. Ideally, this information would be stored on a central database, with software that can identify any trends for us.

This would help us anticipate the rate of transmission in a manner that enables authorities to respond proactively to save lives ahead of the next pandemic.

Sustainable Supply of Test Kits to Healthcare Providers

MMH & Partners recommends the development of a local manufacturing framework for rapid diagnostic testing and screening kits in South Africa, with the aim to provide a sustainable supply of diagnostics to healthcare providers across Africa.

This will require a significant commitment from political stakeholders to improve cross-border collaboration as we aim to develop a pan-African approach to the manufacture and supply of locally-produced test kits instead.

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