Gearbox

BUILDING THINGS THAT MATTER

A CASE STUDY FOR UNDERSTANDING THE STARTUP ECOSYSTEM IN KENYA

This case study was researched and compiled by **Maitri Capital** as part of a report on the Understanding the Startup Ecosystem in Kenya, together with Kenyatta University and other partners, funded by UK Aid

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INTRODUCTION

Innovation isn't just about having a good idea. Many inventors need to turn their ideas into a physical reality, but the cost of the materials, electronics and machinery needed to build a prototype can be prohibitively high. In Nairobi, Engineer Kamau Gachigi has been trying to disrupt this reality. He set up Gearbox's innovation lab, providing entrepreneurs with the equipment to realize their concepts.

Gearbox is an initiative aiming to improve the hardware entrepreneurship ecosystem by providing flexible working space, shared prototyping facilities, manufacturing, fabrication, design training, mentorship, investment opportunities, incubation and acceleration and community development.

Gearbox offers access to materials and equipment, including 3D printing, laser cutting, and electronic circuitry, in a high-tech, 20,000-square-foot shared maker space. It also offers several services, including the membership model where access to machines through a system analogous to a gym membership.

Gearbox also provides hands-on, intensive short courses on Industry 4.0 technologies, business incubation and acceleration (through partners such as the Africa Innovation Ecosystems Group), sub-contracting (for those that don't want to make things for themselves), co-location (sub-letting of space to hardware innovators) and monitoring and evaluation.

HOW DID GEARBOX START ?

Kamau Gachigi while teaching engineering at the University of Nairobi, noticed the lack of idea realization of students and faculty members due to lack of access to equipment to build prototypes. He created a fabrication laboratory at the University of Nairobi in 2009, equipped with computer-controlled machines that anyone at the university could use. Although the fabrication lab grew to a point of getting funding to create interventions for the public health system, i.e., Kenyatta National Hospital, Kamau realized that the bureaucracy within the university was affecting the labs operations.

Kamau partnered with people within the ecosystem in Nairobi with iHub agreeing to set up something for the hardware. iHub's decision was driven by the fact that software companies often came across the challenge of specific customized hardware required. Through funding got by iHub, Gearbox was set up and Kamau asked to design Gearbox. He became the founding CEO working with The Lemelson Foundation from the US.

KAMAU GACHIGI, FOUNDER, GEARBOX

"The model we apply is a little bit like a gym; $100 a month can allow you access every single day, $40 a month can allow you access two days a week,"

SUSTAINABILITY GEARBOX

1. MACHINE AFRICA NETWORK OF INDUSTRIES

This was the first company created. It is a shared production space that enables and houses micro-factories that convert manufacturing inputs to finished products. It represents a unique demonstration of the provision of shared resources to Jua Kali artisans and informal manufacturers. Machine Africa Network of Industries (Machine ANI) prides itself in amenities like s**howrooms** - which are display and retail points for finished products for the center. This is among other strategies employed by Machine ANI that are geared towards marketing locally manufactured products, providing **incubation centers** – for manufacturing shades and workstations that are positioned next to the maker space and rented to beneficiaries and Juakali community**. The maker space is** equipped with machinery required for production and t**raining areas** that provide space for continuous business, technical and life skills capacity building. Machine ANI **provides a space for a supportive ecosystem** and incubation space for hardware entrepreneurs providing SMEs and entrepreneurs access to tools that would typically be beyond their reach.

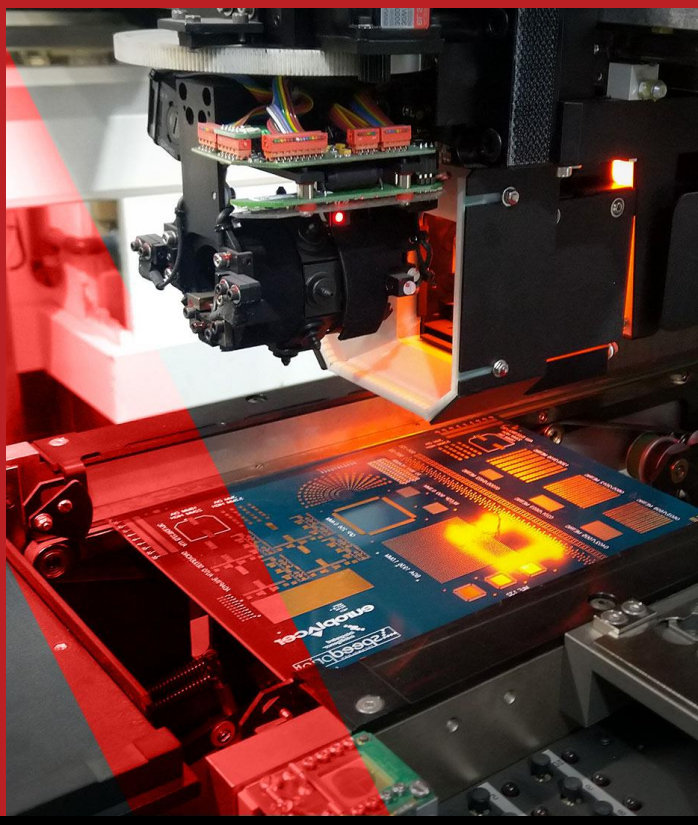
Machine ANI avails all kinds of machines in different parts of the country. Artisans are trained and are allowed to use facilities to meet market opportunities. This has opened the door for organizations interested in bettering the lives of the people in the informal sector

JEFF MWEA, MANAGING DIRECTOR
MACHINE ANI

2. GEARBOX EUROPLACER

This is the second company developed by Gearbox. It is a joint venture with a European company called Europlacer. Europlacer manufactures service mount technology machines. Europlacer in its bid to enter the African market chose Kenya and specifically Gearbox as they were the only innovation space involved in circuits in the country.

Gearbox-Europlacer enables people to make circuits and populate them with the components. Europlacer found Gearbox to be a natural partner. With top-tier technology, gearbox is able to manufacture several circuits at scale.



LATIFF CHERONO,
ELECTRONICS MANAGER
GEARBOX EUROPLACER

"WE ARE BUILDING A SOLID FOUNDATION FOR A HIGH-TECHNOLOGY SECTOR BY KEEPING THE ENTIRE ELECTRONIC VALUE CHAIN IN KENYA."

GEARBOX AND THE WORLD ECONOMIC FORUM: HOW COUNTRIES SHOULD POSITION FOR THE 4TH INDUSTRIAL REVOLUTION

Kamau has worked on advanced manufacturing with the World Economic Forum (WEF) under the global council committee on advanced manufacturing. The Committee's task was to look at how countries could position themselves so that no country was left behind in the 4th industrial revolution.

The analysis looked at the country's economic complexity. Hubs like Gearbox need to target such elements from a policy perspective and focus on areas that they have expertise in.

The work from the WEF identified six levers that policymakers can use to expand economic complexity within the 4th industrial revolution, including technology innovation, human talent, global supply chain and institutional framework.

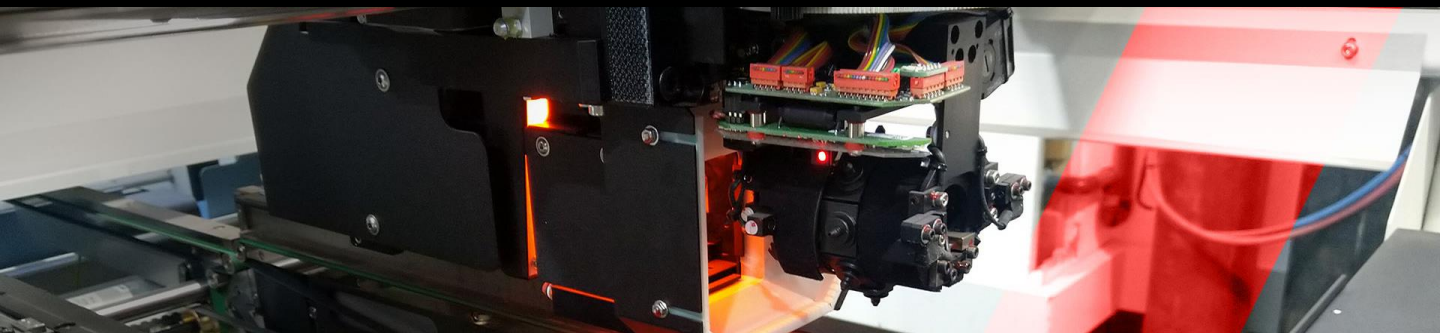
Although Gearbox has the first two, they find themselves having to lobby the government and request them to work together with them to improve the sector. Other than the World Economic Forum, Gearbox has worked closely with Kenya Association of Manufacturers which has been successful in lobbying the government.

FUNDING AND PARTNERS

Gearbox has been funded exclusively from the start by the Lemelson Foundation which leverages the power of invention to improve lives by inspiring and enabling the next generation of inventors. Gearbox has also been funded by Autodesk Foundation, the first foundation focusing investment exclusively on people and organizations using design for impact.

AUTODESK. FOUNDATION

The Lemelson Foundation
improving lives through invention



GEARBOX IMPACT: GEARBOX ACADEMY, BIG FOUR AGENDA

Gearbox has had significant impact both on the Kenyan startup ecosystem through their Gearbox Academy and the country as a whole, through its projects under the Big Four Agenda. Through its various programs, Gearbox has been able to incubate other startups, develop quality products for international markets as well as offer training and certification to entrepreneurs.

GEARBOX ACADEMY

Gearbox academy is a training institution dedicated to promoting digital literacy in engineering by providing relevant hands-on skills through Human Centered Design (HCD) and Industry 4.0 technologies. Gearbox teaches students how to recognize problems in society and then develop workable solutions. Therefore, students use HCD in ideation to create solutions that satisfy the needs of users, and then put those solutions into practice by utilizing industry 4 technologies like embedded systems or digital design and fabrication.

Through Gearbox Academy, learners gain hands-on, practical technical skills relevant in the engineering world today. Entrepreneurs learn how to identify challenges in the society and come up with solutions that are effective and unique. Gearbox Academy also strives to promote digital literacy in engineering and technical fields. It's goal is to bridge the gap between academia and the working industry, promoting the development of industry relevant skills.

3,320

PEOPLE HAVE RECEIVED TRAINING UNDER THIS PROGRAM

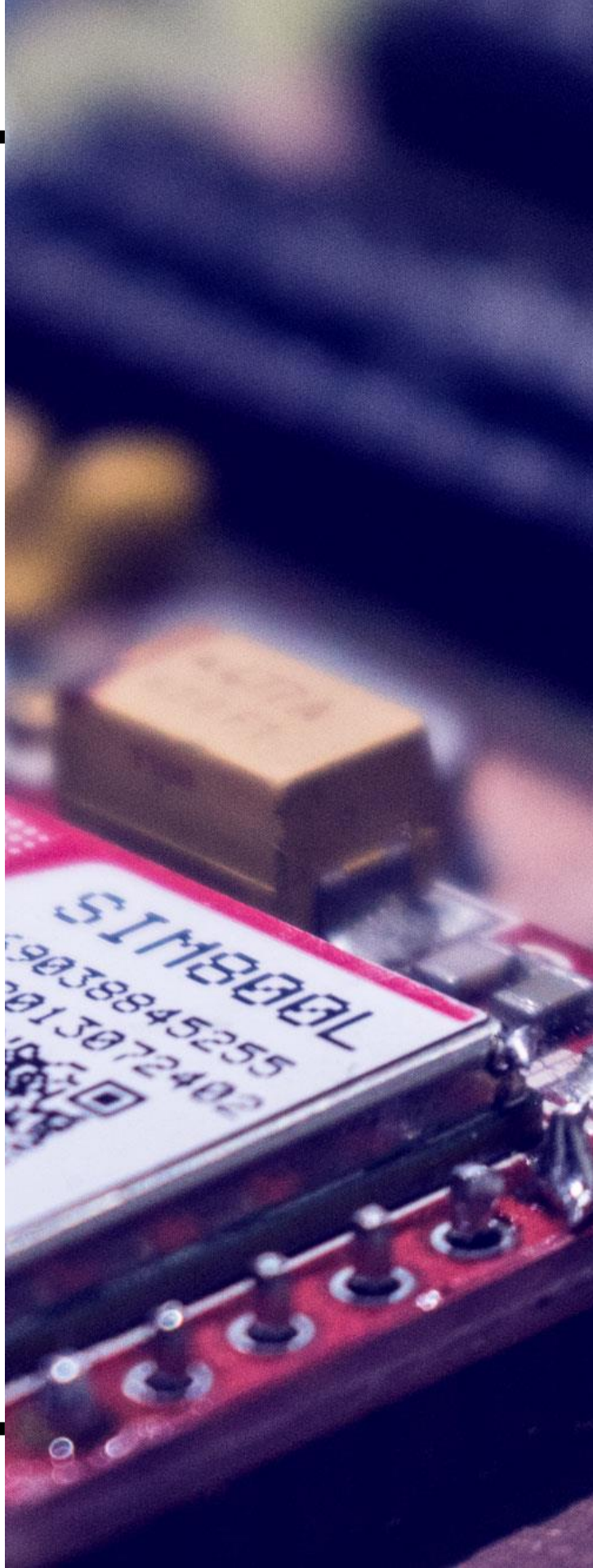
THE BIG FOUR AGENDA

Gearbox decided to adopt programs inline with the Government's Big Four Agenda; affordable housing, affordable universal healthcare, food security and manufacturing. In housing agenda, Gearbox is leveraging the government's affordable housing project targeting 500,000 housing units. Gearbox will manufactures items like doors, windows, shower trays and sockets. These are produced locally to reduce reliance on exports.

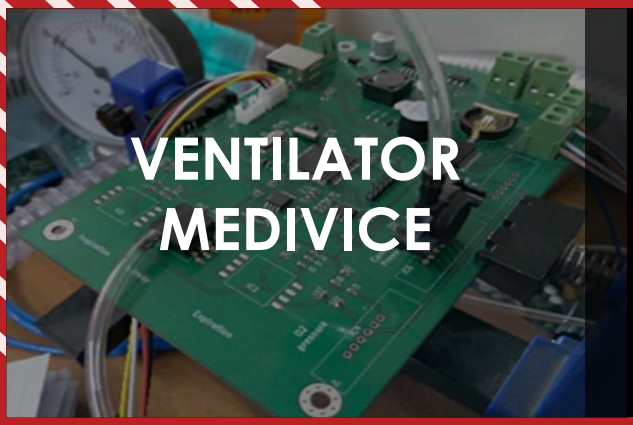
In health, the Ministry of Health approached Gearbox with an offer to help the health sector by having Kenyans locally supply the materials the ministry needed. To this end, therefore, Gearbox was engaged in making hospital beds, stainless steel trolleys and drip stands.

Gearbox is also looking to make surgical sets with R&D already in progress. The work on beds, trolleys, and drip stands are complete and ready for supply from Gearbox's factory in Limuru on behalf of the Jua Kali sector. The instruments are not high-tech products, but the target is to provide import substitution. As the company establishes itself financially, it will target more sophisticated products.

Gearbox is working with the military to produce some products and is also seeking to partner with TVET and The NYS, to teach in the institutions and offer training on machine use.



GEARBOX INNOVATIONS CREATED DURING COVID-19



VENTILATOR MEDIVICE

MedDevice is a medical device startup incubated at Gearbox. It is developing a proportional assist ventilator that can respond automatically to patients' needs.

The unit is going through the final validation check by the Kenya Bureau of Standard and other regulating boards.

OXYGEN CONCENTRATORS

The unit will be able to display the Oxygen concentration of inspired gas via an Android-based control display. The concentrator will have a battery backup of at least 4 hours in the event of a power outage. Save for the necessary clinical grade sensors; this design uses materials in the local supply chain.

80+ PRODUCTS HAVE BEEN REALIZED FROM GEARBOX

KEY LEARNINGS: CHALLENGES, RECOMMENDATIONS

> **"The future is bright for the technology sector if things are done the right way"**
>
> **Kamau Gachigi**
> **Founder, Gearbox**

WHAT ARE THE KEY TAKEAWAYS ?

The growth of venture capital culture and Angel investment is significant to technology. Africa now is on the map due to the rapid spread of the internet across the African continent, which has been heralded as a key driver of prosperity and a sign of the continent's technological coming of age.

However, there is a policy short coming within African countries. Given Africa has many small countries with each having its different policies and regulations. It is difficult for startups to scale easily beyond their borders.

The Kenyan government has been impactful towards the success of Gearbox. The Financial Management Act declaration that any local manufacturer of motherboards shall be exempted from 16% VAT on motherboards and inputs used in the manufacturing process was very significant, as it enabled Gearbox to make circuits competitively with China in collaboration with Europlacer and Wellers Impact (a London-based impact Investment Firm).

RECOMMENDATIONS

Policies such as those encouraging partnerships between foreign entities coming into the country and local entities must be implemented.

The government should put resources in areas of high risk to help spread and mitigate the risk and encourage investors. Money should be pumped into encouraging local development.

To improve startups participation, the government should procure products from startups, makerspaces and local communities.

To make the education system an impactful resource builder, it should be able to adjust and offer more flexibility in terms of adapting to the changing needs of the dynamic market.

FUTURE OUTLOOK

MOVING PAST LEMELSON FUNDING

WHAT NEXT ?

With the Lemelson Funding coming to an end this year (2022), Gearbox is looking to increase its sustainability by concentrating on it's two industries. Gearbox aims at being impactful as much as possible. By continuing with its self-sustainability, Gearbox will not only help on creation of well designed prototypes, but will also be able to generate profit.

The maker space is looking to continue availing manufacturing capacity and injection molding to local producers providing them an affordable space to manufacture without buying machines.

> **"We cannot do what we do without the government's support."**
>
> **Kamau Gachigi**
> **Founder, Gearbox**


Gearbox