

# **Innovations, Technology and Commercialisation: A Backbone to Development in the 21<sup>st</sup> Century**

*Lessons from the Kiira Motors Project*

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By:

**Hon. Prof. Sandy Stevens Tickodri-Togboa**

*Executive Chairman*

Kiira Motors Corporation

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# Kiira Motors Corporation

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Conference Chair,  
Distinguished Invited Delegates and Guests,  
Ladies of Gentlemen

### Background

The Organization for Economic Co-operation and Development, an intergovernmental economic platform with 36-member countries, founded in 1961 to stimulate economic progress and world trade defined Innovation as the implementation of a:

- new or significantly improved product (good or service), or
- process, a new marketing method, or
- new Organisational method in business practices, workplace organization or external relations.

Innovation involves deliberate application of information, imagination and initiative in deriving greater or differentiated value from resources and includes all processes for generation of new ideas and subsequent translation into useful products.

The scholarly community advances three categories of Innovation namely:

- Product,
- Process and
- Business Model Innovation.

The use of new management practices and organization structures, the development and retention of skilled personnel, and new ways of securing financial resources and managing interface with government and other external agencies are also forms of innovation.

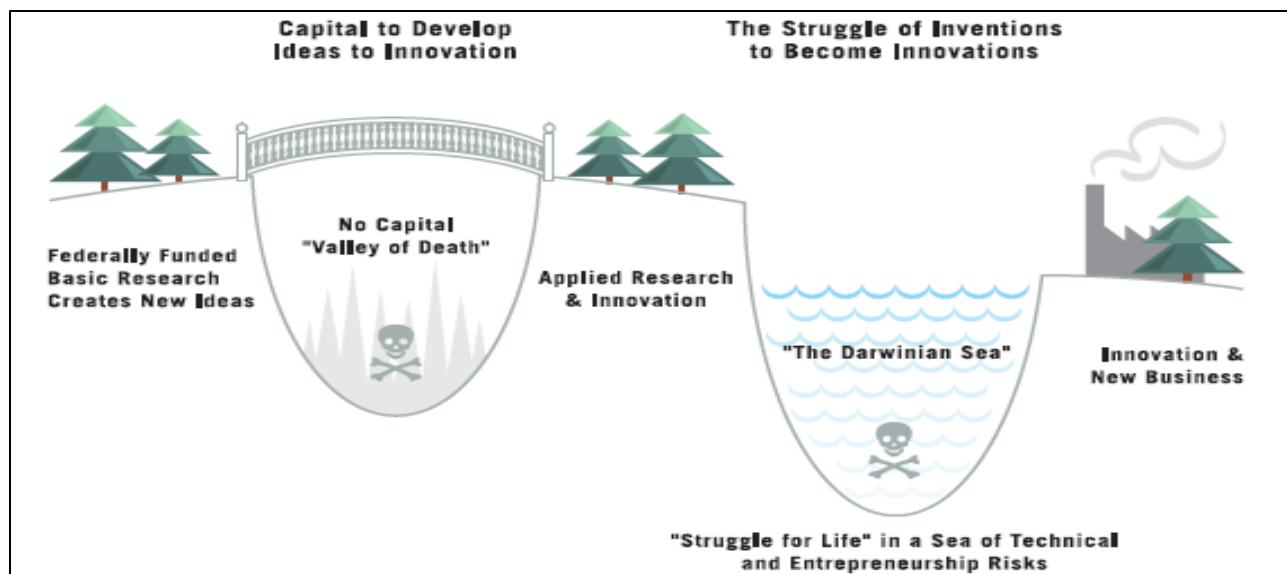
Technology refers to the state of knowledge concerning ways of converting resources into outputs. The generation, exploitation and diffusion of knowledge are fundamental to economic growth, development and the wellbeing of a sovereign state.

Globally, the issue of Innovation for Development is an imperative policy priority for many governments. Government can play an important role in shaping a country's innovation performance through:

- Creating enabling infrastructure for innovation,
- Improving the business environment,
- Establishing well-balanced Intellectual Property Rights Management Systems,
- Investing in human resources (skills development),
- Enhancing the Research & Development (R&D) infrastructure to attract private investment, and
- Encouraging establishments of industrial clusters in serviced parks.

It is imperative to note that the Technology Commercialisation lifecycle involves several risks which call for sustainable funding interventions to realize viable business from ideas. Scholars have defined two (2) regions of high risk requiring financial intervention, namely.

- the Valley of Death and
- the Darwinian Sea illustrated in *Figure 1*.



*Figure 1: Valley of Death and Darwinian Sea*

Many Governments like Finland, Germany, South Korea, Singapore, Malaysia, Canada, Vietnam, United States, etc., have instituted Statutory Funds (termed “*Innovation Fund*”) to support Innovation with the potential for social impact at a large scale, whether they are new technologies, business models, policy practices, or behavioral insights, through grants, loans (including convertible debt) and equity participation.

Such support is availed to innovators at all stages of the Innovation life cycle, from start-up and pilot testing through to larger scale implementation. In general, Government supports takes two forms:

- Direct Government support for R&D through procurement preferences, tax incentives, and

- Direct Grants, loans; or Government intervention in the market through Direct Government funding or incentives for private venture capital funding to finance innovative technology-oriented firms that are engaged in commercialization of outputs Research and Development.

Investment in Research and Development by Government and Private Sector is a critical factor that differentiates a Country's Innovation Performance and subsequently Sustainable Growth. Our National Development (NDP) II targeted a Gross Domestic Expenditure on Research and Development (GDERD) as a percentage of Gross Domestic Product of 1% and a Technology Achievement Index (TAI) of 0.21, thus placing Uganda in the dynamic adopters group by 2020.

The Science, Technology and Innovation Statistical Abstract of 2016 highlighted that GDERD dropped from 0.5% in 2010 to 0.23% in 2014, while the TAI dropped from 0.15% in 2010 to 0.14 in 2014%.

His Excellency the President of the Republic of Uganda has been supporting several innovators using various modalities including the Presidential Initiative for Science and Technology Innovations, and the pledged a further UGX 500 Billion Innovation Fund in December of 2015, with the first appropriation of UGX 30 Billion to Vote 023 of Ministry of Science Technology and Innovation commencing in FY2017/18.

The subsequent severing/cutting of this Innovation Fund in FY 2018/19 has indeed presented significant ramifications on the continuity of the supported projects that required a sustainable financing structure to succeed. This further escalated the challenges related to attraction, development and retention of high-quality human capital for innovation.

It is instructive for us to note that Uganda's total Research and Development personnel per 1 million inhabitants dropped from 63 in 2010 to 47 in 2014. This presents a dig challenge to us. Studies from the United Nations on the progress of achievement of Goal 9 of the Sustainable Development Goals indicate that the global average in 2013 was 1,083 researchers per 1 million inhabitants, while the ratio ranged from 65 per 1 million in the least developed countries to 3,641 per 1 million in developed regions.

It is worth noting that Countries that have improved their Innovation Performance Index over the past decades, such as Finland, Germany, Korea, Singapore, United States, etc., have all achieved this by implementing sound public policies in shaping greater national innovation capacity through intervention with Statutory Innovation Funds.

### **The Case of Kiira Motors Corporation**

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Kiira Motors Corporation is a State Enterprise, established to undertake the Commercialisation of the Kiira Electric Vehicle Project and to champion value addition in the domestic automotive industry for both job and wealth creation. The Ministry of Science Technology and Innovation was mandated from 2006 at its formation/inception to provide necessary Policy Guidance and Oversight to Kiira Motors

Corporation.

Kiira Motors Corporation is poised to address the Mobility needs of the Target Market with an Offering that includes:

- Buses for Mass Mobility to meet the needs of the Traveller who needs not to own a Vehicle,
- Utility Vehicles (Sports Utility Vehicles and Pick-ups) to address City and Off-Road utility duty cycle,
- Executive Sedans Such as the Kiira EVS Made-To-Order for the Niche Market Segment of High Profile Persons Seeking Executive Mobility and for Car-Sharing Services.

Whilst vehicles operating with Internal Combustion Engines (ICEs), using Diesel and Gas, shall be available, our ultimate focus shall be on Alternative Clean Energy Mobility Devices. Already the East African Community Vehicle Market is project to increase beyond 500,000 pieces per year. It is therefore timely for Uganda to position herself to tap into the Opportunity Space associated with this anticipated Growth. It is thus imperative that the development of the domestic automotive value chain addresses the issue of development of local content.

It is envisaged that the Assembly Plant will generally provide up to 15% of the Job Opportunity. This means that 85% of the Job Opportunity will lie in the Supply of parts, components and services.

The roadmap for the domestic manufacture of these Auto-Parts has already been developed. Noteworthy players in this regard are those Domestic Manufacturers, such as Uganda Batteries Limited, which has been in the Business since 1958 making car batteries, and Paint Companies, such as those already making Plascon, Peacock Paints and so on. What is needed is to consolidate these modest initiatives with the purpose of increasing the scope of production of Auto-Parts in Uganda to include production of Lithium-Ion Batteries, Auto-Glass, Brake Pads, Body and Chassis etc.

Here are some Quick Facts about the Kiira Motors Corporation's Journey. The story of Kiira Motors goes back 13 years. In 2008, the Vehicle Design Summit 2.0, an International Student-Led Consortium that aimed at leap-frogging sustainable transportation technologies, convened teams from 31 premier universities to build the Vision 200 (a 5-seater Plug in Hybrid Electric Vehicle) under the leadership of Massachusetts Institute of Technology (MIT). Makerere University, the only African participant, was the lead team in the development of the Power Electronics and Data Networks for this Vision 200 Electric Vehicle (shown in Figure 2). This Vision 200 was completed in October 2008 launched on the 24th November 2008 in Torino Italy[2].



*Figure 2: The Vision 200 on display at the Automotive Museum in Turin, Italy, from 22 September – 24 November, 2008.*

With the knowledge and skills acquired from the Torino experience, the Makerere University Team returned home ready to confront the Country's challenges in fields of energy, transport and the environment through the application of advanced technologies.

This zeal and aspiration led to the conception of the Center for Research in Transportation Technologies (CRTT) in 2009 with a mission to champion Research and Development of green transportation solutions for Uganda in particular, and Africa at large.

CRTT established its first project, the Vehicle Design Project (VDP), whose main aim was to design and build the first Ugandan 2-seater Electric Vehicle code named Kiira EV. The Vehicle Design Project team was constituted of student scholars offering Bachelors of Science degrees in the fields of Electrical, Mechanical and Telecommunications Engineering in their pre-final and final, under the mentorship of **Hon. Prof. Sandy Stevens Tickodri–Togboa** and **Paul Isaac Musasizi**. The product of this project was delivered in October 2011 and His Excellency Yoweri Kaguta Museveni – the President of the Republic of Uganda, was able to launch it on 24<sup>th</sup> November 2011, precisely 3 years after the launch of Vision 200 in Torino, Italy.

After this successful and historical launch of the Kiira Electric Vehicle in 2011, CRTT was extended a seed pledge of 70 million USD (154 billion Uganda Shillings) by His Excellency Yoweri Kaguta Museveni – the President of the Republic of Uganda. Kiira Motors Project (KMP) to set up as CRTT's se-

cond Project, with the eventual goal of establishing Kiira Motors Corporation (KMC) as the first Automotive Original Equipment Manufacturing (OEM) in East and Central Africa by 2039[2].

Along this transformational journey, Kiira Motors designed and built two more concept cars: the Kiira EV SMACK – a five-seater plug-in hybrid electric sedan and the Kayoola Solar Bus - a Battery Electric Vehicle with a Real-Time Solar Charging System for range extension. These were launched in 2014 and in 2016, respectively.

### **The Three Iconic Kiira Concept Vehicles**

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#### ***(i)The Kiira Electric Vehicle (Kiira EV)***

The Kiira EV – the first fully electric car made in Africa (in Figure 3) was released on 24th November 2011 as a Proof of Concept (PoC) car. The Kiira EV runs on a battery bank with 64 Lithium ion cells and powered by a 26HP Alternating Current Induction Motor achieving a maximum speed of 100Km/hr and a Range of 80Km, with a totally zero tail pipe emissions and insignificant powertrain noise. It is front-wheel enabled and conforms to the Ugandan Traffic laws of Right-Hand Drive steering configuration [3].



***Figure 3: H.E Yoweri Kaguta Museveni Rides in the Kiira EV at Launch Event***

#### ***(b) The Kayoola Solar Bus***

The Kayoola Solar Bus (in Figure 4) – a true heritage of African Science and Technology Innovation, was launched by His Excellency Yoweri Kaguta Museveni on 16<sup>th</sup> February 2016. The Kayoola is a 34-seater Solar Electric Bus designed, with a powertrain architecture based on two battery banks. The primary battery bank supplies electrical energy to the propulsion motor while the secondary power bank is



available for charging, either in real time using the on-board solar charging system or the plug-in electric charger system[2]. The solar panels are mounted on the roof, fully taking advantage of Uganda's abundant sunshine due to its exceptional position at the Equator. The Kayoola Solar Bus runs for 80km on full charge, with daily solar range extension of 12km and completely zero tail pipe emissions.

This program has been supported by a wide spectrum of artisans, craftsmen and technicians especially in the informal manufacturing sector[5]. These skilled personnel have demonstrated readiness for fabrication of vehicle seats, vehicle structural frames and body panels from metal and fiberglass, mechanical and electrical system physical integration. This is a true testament of the availability of a labour pool in Uganda capable of supporting Kiira Motors Corporation (KMC) - a government program for industrialization through Automotive Engineering & Manufacturing, thus contributing to the strategic transformation of Uganda into a middle-income economy by 2039.

The aspiration for green, clean, and noise free transport solution for Urban Mass Mobility, enhancing Environmental Stewardship, inspired the making of a solar powered vehicle. The sustainability of Mission Vehicles made in Uganda is based on production of eco-friendly and internationally acceptable Technology and Products for global competitiveness.

The Kayoola Solar Bus proposes to provide a green, clean, and noise free transport solution for Urban Mass Mobility, representing our commitment to Transportation Technology and enhancing Environmental Stewardship.



**Figure 4: The Elegant Kayoola Solar Bus (Source: [2])**



The Kayoola Solar Bus's uniqueness is evident from the commitment it represents for Africa to championing Urban Mass Mobility Solution based on clean and green Technology for enhanced Environmental Stewardship. Africa's Geographical Position almost symmetrically along the Equator implying Non-Stop Sun throughout the Year provide an underutilized natural and renewable energy resource which should be explored to fuel Urban Mass Mobility. The Kayoola Solar Bus is leading the way in this quest.

***(c) The Kiira EVS***

Kiira Motors aimed at developing transport solutions that address the nation's needs of both private and public mobility[2]. Kiira Motors Corporation unveiled the Kiira EVS Figure [5], a four-seater executive vehicle built off the Kiira EV SMACK platform fitted with a 2.0 Litre petrol engine, five speed automatic transmission and 60 Litre Fuel Tank with an exquisite beige interior trim.



***Figure 5: The Luxury Kiira EV SMACK***

The Kiira EVS will be Made-to-Order for the Niche Market Segment of High-Profile Persons seeking Executive Mobility and will include options for Car-Sharing Services. It is our undertaking that the Kiira EVS's capabilities in handling the mobility needs of prospective buyers will be demonstrated.

The use of private mobility automobiles is significant in Kampala City and this is placing a big traffic burden on the limited road infrastructure. Kampala has a mass mobility system that mainly utilizes 14-Passenger vans for intra and intercity mass mobility. The projected mass mobility Demand Growth is estimated to be 5 times in the next three years in Kampala and exceeds the figure 700,000 passengers per day, while the neighboring routes feeding into Kampala such as Jinja, Entebbe, Masaka and Bombo road, are expected to have 500,000, 200,000 and 300,000 passengers per day, respectively. Kampala

Capital City Authority has an existing demand for Over 1000 buses for its major routes. The Kayoola Solar Bus promises a green, clean, and noise free future transport solution for a Busy City like Kampala and other urban centers in Africa.

## **Key Accomplishments by Kiira Motors Corporation**

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### ***(i) Kiira Vehicle Plant Construction:***

The detailed Design Specifications and Bills of Quantities for the Kiira Vehicle Plant start-up facilities (initial installed capacity 5,000 vehicles per annum) were developed by the start of 2019 and included the assembly shop, office block, circulation roads, power and water distribution systems, waste management facilities, fence and gate facilities, drainage system and key vehicle test facilities. The construction and installation of 3.7 kilometer long 33kV electricity line connecting the Kiira Vehicle Plant site to the national electricity grid are completed, as well as the construction and installation of a 5.4 kilometer long 6-inch water pipeline connecting the plant site to the municipal water supply. Opening up of key circulation roads, clearance and fencing-off of the plant site are a work in progress. The cadastral and topographic survey and geotechnical analysis of the plant site are completed, and Certificate of Title FRVJA262 FOL.3 issued. The Environmental Impact Assessment was also completed and the Certificate No. 0008328 issued by the National Environment Management Authority.

### ***(ii) Vehicle Assembly and Technology Transfer Partnerships:***

Kiira Motors Corporation engaged several prospective partners and signed Non-Disclosure Agreements with potential Contract Assembly Partners to pave the way for the pertinent joint-partnership feasibility studies.

### ***(iii) Automotive Local Content Development:***

Kiira Motors Corporation has identified over 105 manufacturing companies which are either already in the business of auto parts manufacturing, such as Uganda Batteries Limited, or have potential for auto parts manufacturing. Key stakeholder engagements are ongoing to put in place the relevant modalities for developing these companies as domestic manufacturers and suppliers of auto parts (batteries, auto filters, seats, web frames, auto paints, body panels, etc.) for the Kiira Vehicle Plant.

Kiira Motors Corporation has also developed a roadmap for Domestic Auto Parts Manufacturing aligned to the Roadmap for the Commercialisation of the Kiira Electric Vehicle Project.

### ***(iv) Human Capital Development:***

Key employees have undertaken vocational and professional training in automotive assembly, vehicle manufacturing systems, automotive engineering, and technology commercialization, among others. More of these exercises will continue.

(v) ***Vehicle Development:***

Mission Vehicles Made in Uganda has designed and built three Concept Vehicles:

- the Kiira EV - Africa's first Electric Vehicle;
- the Kiira EV SMACK - Africa's first plug-in Hybrid Electric Vehicle; and
- the Kayoola Solar Bus - Africa's first Solar Electric Bus.

The Kayoola Solar Bus was the headline exhibit at the 2<sup>nd</sup> United Nations Environment Assembly Sustainable Innovation Expo 2016 at the United Nations Environment Programme Headquarters, Nairobi, Kenya.

(vi) ***Awards and Recognition:***

The leadership in technological innovation and strategic product development demonstrated by the Kiira Motors Corporation was recognized by Frost & Sullivan, a global market research and consulting firm, with the Best Practices Award for Visionary Innovation Leadership in Sustainable Mobility 2016. Mr. Paul Isaac Musasizi, Chief Executive Officer of Kiira Motors Corporation, was awarded the African Leadership Medal of Honor in Business Award and Induction into the African Chief Executive Officers' Hall of Fame. This was at the International Forum on African Leadership held on Tuesday 25<sup>th</sup> September 2018, New York, USA.

(vii) ***Business Case and Feasibility Study for Setting-Up and Operating the Kiira Vehicle Plant:***

The Ministry of Finance, Planning and Economic Development, after eighteen months' review, approved the feasibility study for setting up and operating the Kiira Vehicle Plant in Uganda.

## **Opportunity for Automotive Local Content Participation in Uganda**

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The size of the vehicle market in the East African Community (EAC) grew from 158,000 in 2011 to 257,000 in 2015 and is projected to reach over 500,000 by 2027 [4]. Despite the growing demand for vehicles in Uganda and the EAC, vehicles are predominantly imported as Fully Built Units without domestic value addition. The Uganda vehicle import value grew from US\$ 190 Million in 2005 to US\$ 550 Million in 2015 [5] at a Compound Annual Growth Rate of 11.8% representing approximately 10% of the National Gross Import Value. The consumerism perspective in the vehicle market not only undermines the prospects of domestic value addition, but also contributes to the undesired growing trade deficit. Without strategic interventions for harnessing such opportunities to drive industrialization, unemployment and under employment challenges can only escalate.

Cognizant of the need to develop the domestic auto-industry, government of the republic of Uganda allocated 100 acres of land and seed funding as capitalization for setting up and kick-starting the operations of the Kiira Vehicle Plant.

In order to successfully establish a sustainable Uganda Automotive Industry, there shall be need for deliberate efforts to promote innovation and local content participation in line with existing policy and regulatory frameworks, to stimulate:

- Domestic manufacture of auto parts and components;
- Automotive Market Development with a view to accessing affordable end-user finance through strategic purchase programs;
- Enterprise and Human Capacity Development to enable participation in the domestic Automotive Industry; and
- Automotive Technology Development and Transfer across different Institutions including; Universities, Research and Technology Incubation centers and enterprises.

Uganda is well positioned for participation in automotive innovation and local content development. The automotive industry in the East African Community Region has already attracted interest from the leading multinational Original Equipment Manufacturers from:

- Japan (Toyota, Mitsubishi, Suzuki, Mazda),
- Europe (VW, Mercedes Benz, IVECO),
- USA (GM and Ford),
- Korea (Hyundai, KIA) and
- China (FOTON, Cherry).

Noting that each of these companies will typically assemble vehicles with as many as 8,000 to 12,000 different components and more than 30,000 individual parts, domestic production of these components will provide immense employment opportunity. Furthermore, given that vehicle assembly or manufacture typically accounts for just about 15% of the automotive sector job opportunity space, clearly it will be the supplies of the automotive parts and allied services that will constitute the 85% of the employment space opportunity.

Uganda indeed has an abundant human resource. In 2010, the Ministry of Gender, Labour and Social Development estimated that the Ugandan economy needed to absorb about 392,000 new entrants into the labor market. The labor force growth rate, on the other hand, was estimated to be at 4.7 per annum in 2009/10 - a rate which was clearly higher than the population growth rate. Creating employment opportunity space for this young population is an undertaking that must not be delayed or postponed.

Uganda also has huge potential to tap into the development and processing of her abundant natural resources to yield steel from iron ore deposits, plastics from oil and gas, lithium ion batteries from graphite, lithium and cobalt deposits, vehicle upholstery and interior padding from cotton and leather, and glass from silica and sand among others. All these products will find wide applications in the automotive

industry. So in fact the development and expansion of the automotive industry is a necessary stimulant for the development and expansion of our mineral resources.

## **Key Inputs for Local Content Development Enhancement in the Automotive Industry**

### ***(i) Governance***

The Automotive Value Chain in Uganda is loosely coordinated by activities from different Government Ministries and Agencies including; Ministry of Works and Transport, Uganda Revenue Authority, Ministry of Science, Technology and Innovation, etc. The Government of Uganda is committed to establishing local automotive assembly and manufacturing capabilities through Kiira Motors Corporation which is spearheading innovation and local content initiatives through Ministry of Science, Technology and Innovation. Kiira Motors Corporation has built three vehicle concepts with the Kayoola Solar Bus having over 60 % local content.

The Government of Uganda is currently processing a Local Content Bill (2017), which proposes a National Local Content Committee. The Government also passed into law a ban on importation of vehicles which are older than 15 years and recently announced a ban on importation of fully- or completely-built buses. These are steps in the right direction.

The East African Community is also proposing the establishment of the Automotive Industry Council of East Africa and respective national councils and national automotive industry coordination Offices, to streamline efforts of governance of the automotive value chain<sup>1</sup>.

### ***(ii) Policy Advisory, Promotion and Advocacy***

Uganda's automotive industry is still in its infant stages - no sector specific associations and automotive policy councils have been established. However, Associations, such as the Associated Motor Dealers, and the Uganda Manufacturers' Association, have been actively and persistently engaging the Government and Policy-makers to put in place mechanisms that will promote local manufacturing. Some of successes registered; especially by the Uganda Manufacturers Association, include:

- The Buy Uganda Build Uganda,
- The Textile Policy,
- The Sugar Policy.

### ***(iii) Relevant Infrastructure***

The Government of Uganda, through the Uganda Investment Authority, plans to establish a minimum of twenty-two Industrial and Business Parks throughout the Country to support Local Manufacturing

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<sup>1</sup> Draft Terms of Reference for the Establishment of the Automotive Industry Council of East Africa (AICEA)

through value addition to the raw materials within the country. Kiira Motors Corporation is already setting up one plant in the Jinja Industrial Park.

It should be recognised and emphasised that to reap benefits of clustering of industries in the prospective industrial parks, such parks that will host automotive businesses should be accordingly designated as automotive industrial parks. Those parks hosting other businesses should likewise be prioritized into the strategic industrial sectors. And here Government needs to have clear plans for the development of access roads, extension of standard gauge railway lines, internet fiber-optic links and provision of other social infrastructure in such parks.

#### ***(iv) Enterprise and Human Capital Development***

Uganda has a total of 47 Universities, of which 11 are public and 36 are private. Of these it is only Kyambogo University that offers a Bachelor's degree in Automotive and Power Engineering.

Outside these Universities, there are over 102 technical and vocational education training institutions. Among these Vocational Training Institutions, it is almost Nakawa Training and Vocational Institute only that provides comprehensive automotive-specific vocational training skills.

The current scope of vocational training in the other Institutions have remained limited to the traditional courses, such as carpentry, civil-work masons, electrical foremen, specialized welding, forging, casting, machining and surface finishing. There is thus urgent need for coordinated efforts to address the gaps specific to the automotive value chain skills requirements. Whereas the Government did develop the Business, Technical and Vocational Education and Training Strategic Plan 2011-2020, titled "Skilling Uganda" and aimed at developing the human resource with employable skills and competencies relevant in the labour market, this has remained largely unimplemented in terms of the requirements for the automotive Sector,

The other Institutions where similar coordinated efforts should be directed towards streamlining the employability of the human resource in the automotive Sector include:

- The Uganda National Entrepreneurship Development Institute,
- The Competitiveness and Enterprise Development Project,
- The Uganda Investment Authority's Entrepreneurship Training programme, and
- The Uganda Skills Development Project managed jointly by Ministry of Finance, Planning and Economic Development and the Private Sector Foundation Uganda.

#### ***(v) Technology Development, Transfer and Diffusion***

Uganda's automotive technology development and transfer initiatives have essentially been realized through reverse engineering, licensing from multinational companies and in some rare instances through collaborative Research and Development with:



- Universities, such as Makerere University,
- Research Institutes, such as the Uganda Industrial Research Institute (UIRI) and
- The Uganda National Council for Science and Technology (UNCST).

There is indeed evidence of technology development by innovators such as Kiira Motors Corporation, the Motor Vehicle Mulimi, the Katwe Metal Workers, such as MUSABODY, that have been recognised by the Uganda Registration Services Bureau through granting of innovators' and inventors' exclusive intellectual property rights once their innovations are registered. Some other automotive value chain actors, such as Uganda Batteries Limited - the local market leader in auxiliary battery production that was acquired technology through a partnership agreement with Chloride (UK) Ltd, have also been recognised.

*(vi) Financing*

The Innovation Fund announced in December 2015, as of now, is one of Government's Funding Instruments for encouraging creativity and supporting innovations in Uganda.

Innovators in Uganda have also previously accessed funding through the Presidential Initiative for Science and Technology, started in 2010 in Makerere University with the initial ring-fencing of UGX25 billion over a period of five years. Kiira Motors Corporation of course has been a major beneficiary of this initiative and perhaps the flagship success in this regard.

Uganda is one of the countries that attract Foreign Direct Investment most in the East African Community. Uganda's Foreign Direct Investment is estimated to have increased by 18.5% in 2017. The minimum capital investment required for a foreign investor to be eligible to invest in the country in any sector, apart from those that may compromise the country's security, is \$100,000 over three years, as stipulated by Uganda Investment Authority. In the Automotive value chain, there are a number of FDIs including:

- Toyota Uganda Ltd,
- TATA Uganda Ltd,
- SKenya Uganda Ltd,
- Motor Care Uganda Ltd, and
- Mobikey Uganda.

The other sources of funding include:

- Matching Grant Facility (MGF),
- Soft Loans,
- Venture Capital,
- Competitions,

- Commercial loans among others.

Commercial loans from banks, per se, attract high interest rates, averaging at 24%, and demand high levels of collateral, predominantly in form of immovables that most Micro-Small-Medium Enterprises of course do not have.

Inevitably therefore Government will need to provide more of the so-called “meet-half-way” grants or funds to fast track domestic automotive component manufacturing.

***(viii) Collaboration and Integration***

Through collaborations with Uganda’s Government, Parts suppliers and Makerere University, Kiira Motors Corporation designed and built three concept vehicles and is positioned to start commercial production in 2019. More collaboration between private innovators and research centers should be promoted to increase levels of local content development.

***(ix) Value Chain Performance Assessment***

The certificate of origin issued by URA differentiates products manufactured in the EAC region from those out of the region. This is used to determine the percentage of local content in the product depending on the origin of inputs used in entire manufacturing process and can be extended to the automotive value chain.

The Uganda National Bureau of Standards is the statutory body responsible for standardization, quality assurance, promoting local industries and protecting consumers. UNBS has drafted the DUS 1928 the Bus body design and construction standard. It is expected that UNBS develop similar standards for the Uganda’s automotive value chain.

***(x) Macro Economic Incentives for Market Development***

The Government of Uganda has provisions for a wide range of tax incentives to businesses to attract greater levels of FDI into the country. All investors with a license from the Uganda Investment Authority are entitled to tax exemptions and refunds on; Imports of necessary equipment, motor vehicles; and VAT incurred on the purchase of building materials for industrial/commercial buildings. Gazetted vehicle assemblers in Uganda are entitled to import duty exemption according to the EAC Customs Union External Tariffs.

The East African Community Rules of Origin also offer tariff relief where the minimum value added by a producer in a partner state is 30% of the ex-works price of the given product. URA should push for a local content requirement of at least 30% at the start to encourage local content development and resource utilization.

Uganda's fiscal incentive package for both domestic and foreign investors provide generous capital recovery terms, particularly for medium and long-term investors whose projects entail significant plant and machinery costs and involve significant training. For example, 50% of capital allowances for plants and machinery are deductible from a company's income on a one-time basis for an investor setting up in Kampala, and 75 % for the rest of Uganda. Policies such as BUBU also encourage domestic production.

Energy rebate incentives were introduced by Electricity Regulatory Authority (ERA) to encourage manufacturers to build industries in remote areas with no existing electricity infrastructure.

*(xi) Assessing the Potential of Existing Companies*

According to the State of the Nation Speech by His Excellency The President of Uganda, delivered on 9<sup>th</sup> September, 2018, Uganda has 4,725 factories engaged in different manufacturing sectors including; food processing, beverages, chemical products, paints, soap and foam, construction materials, plastic and plastic composites, metal fabrication, textiles, clothing and foot wear, paper and printing, wood processing, electronics, pharmaceuticals, etc.

The UMA directory of 2018 highlights over 100 manufacturers with potential for direct or indirect participation in the nascent automotive industry including; metal fabrication and engineering services, plastics and plastic composites manufacturing, fiberglass products, Oil and lubrications blending, paints, rubber products and electricals and electronics. Key stakeholder engagements are ongoing to put in place the modalities for developing these companies as domestic manufacturers and suppliers of auto parts.

The key domestic players include:

- Luweero Industries,
- Fabrications Systems,
- Victoria Engineering,
- GM Tumpeco Giant Uganda (metal fabrication works);
- Gentex Enterprises,
- Blowplast,
- Nice house of plastics;
- Henkel (fibre glass)
- Axcl Lubricants
- CCLE Rubber Company Ltd ( lubricants and tyres respectively),
- Cable Corporation,
- Electrical Controls & Switchgear Ltd,
- Gayaza Electronics Ltd (electrical components).

Based on this established manufacturing potential, Kiira Motors Corporation has developed a roadmap (Fig.4) for automotive local content participation with emphasis on local parts manufacturing. This shall require strategic collaborations along the value chain and product, process and business model innovation to adapt to the automotive industry requirements.



Figure 6: The Road Map to parts and Components Development in the Ugandan Automotive Industry.

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