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Using Motorized Two and Three- Wheeler Transport to Enhance Youth Employment in Kenya: A Descriptive Approach

Simeon Tunje and Kenneth Yogo

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Using Motorized Two and Three- Wheeler Transport to Enhance Youth Employment in Kenya: A Descriptive Approach

Simeon Tunje and Kenneth Yogo

Kenya Institute for Public Policy Research and Analysis

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Abstract

The road transport sector through two- and three-wheeler (TTW) operation, though informal, has helped fill the youth employment gap. That said, to fully exploit the employment potential for the youth, it is important to identify the constraints and skills gap along the value chain. This study sought to analyze the TTW value chain and their contribution to job creation; identify key constraints to the growth of the TTW sector; assess the employment creation potential along the value chain; and analyze the labour skills gap in TTW transport sector. The entire value chain includes imports of TTW, distribution, manufacture and assembly of the imports, wholesale and retail of TTW, operations, disposal and ancillary activities. A descriptive approach to skills gap and employment potential was used in addition to estimating employment elasticity. The study used KIHBS 2015/16 and 2005/06 and KNBS statistical abstracts data for TTW industry. The findings suggest that the impediment to youth employment is dependent on imports and negligible manufacturing and assembly of TTW in the country. In addition, most riders lack relevant skills, leading to accidents and fatalities. The study recommends enhancement in manufacture of components and parts, which is currently negligible and largely informal; implementation and enforcement of the existing legislation and regulation to curb high fatalities; and streamlining of the sector to improve youth employability.

Abbreviations and Acronyms

TTW	Two-Wheeler and Three -Wheeler
KNBS	Kenya National Bureau of Statistics
ICT	Information Communication Technology
GVC	Global Value chain
CBU	Completely Built Unit
CDK	Completely Knocked down

Operational Definition of Terms

<i>Tuk Tuk</i>	A three-wheeled motorized vehicle used for ferrying goods and passengers
<i>Boda Boda</i>	A motorcycle used as taxi for goods and passengers
<i>Matatu</i>	A minibus used for public transport.

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1. Introduction

Road transport forms the largest sub-sector of the transport sector. The two- and three-wheeler (TTW) segment is the glaring face of informal source of employment to the young people majority of whom operate as riders (Utopia, 2019; Mbaye, Coulibaly and Gandhi, 2019). As such, the segment has great potential in mitigating the youth unemployment challenge through exploiting both forward and backward linkages in the value chain to increase job creation prospects. The global value chain of the TTW consist of essential nodes that link and assist in job estimation, including the location and number of jobs in the value chain (Newfarmer et al. 2018).

In Kenya about 75 per cent of the population live in rural areas where the road network consists of paved gravel and earth roads (Summary, 2007). More than 15 percent of the Kenyan population lives in the first-tier urban cities (KNBS, 2019). This includes Nairobi and Mombasa, and towns such as Nakuru and Naivasha. The roads in these areas are tarmacked and highly maintained except for poor drainage systems which lead to frequent traffic jam and longer travel times whenever it rains. As such, there have been notable inefficiencies in the formal public transport systems leading to the emergence of TTW (Kumar, 2011; Makhanu, 2015). Considering these inefficiencies, the two-wheeler is the preferred and prominent means of transport in rural and peri-urban localities whereas the Three-wheeler is common in urban areas, including major cities such as Mombasa and prominent towns such as Bungoma. The ease of accessibility, maneuverability and end point connectivity of the TTW has enhanced acceptance as the alternative means of transport. Moreover, the wheelers' ability to penetrate the deep isolated and unnetworked rural places has acted on their advantage over and above creation of employment directly and indirectly to the youths (Jenkins and Peters, 2016).

The TTW presents itself as an epicentre of multiple opportunities, including but not limited to job creation, youth empowerment and GDP growth. This is due to its ability to create jobs to skilled, semi-skilled and unskilled individuals. The TTW value chain creates opportunities for value addition at various levels such as the sea port and inland port, assembly and manufacturing plants, wholesale and retail, operation, repairs and disposal. So far, the operation node provides the highest number of job opportunities as one two-wheeler directly employs one individual for operating while a three-wheeler employs at most two direct jobs for operation.

According to data from the statistical abstract (KNBS, 2019), the manufacturing node employs more than 3,001 individuals and the assembly process contains

more than 45 activities in the manufacturing. The wholesale and retail node employ a total of 9,206 while repair and maintenance employs 36,799 individuals, these includes skilled and semiskilled employees. The segment depicts a high potential for growth on workers productivity due to the wage rate increasing by around 1.03 per cent annually between Ksh 30 to Ksh 156 as per geographical region. The TTW manufacturing industry depicts a positive growth trajectory from Ksh 761.5 million in 2014 to an estimated Ksh 990.0 million in 2018 (KNBS, 2019). The wholesale and retail sector for the sale of TTW and motor vehicles grew from Ksh 3,305.8 million in 2014 to an estimated Ksh 4,808.5 million in 2018. The maintenance and repair of motor vehicle and TTW sector performed robustly, with earnings of Ksh 9,856.0 million in 2014 to estimated Ksh 16,041.7 in 2019 (KNBS, 2019)

Previous studies indicate that more than 80 per cent of the TTW operators are aged between 15 and 35 years. Indirect jobs include mechanics, pump attendant and insurance agents. Previous studies are limited to analysis of value chain constraints, and value chain mapping but lack information on numbers employed and employment potential of the sector. The TTW segment contributes Ksh 2 billion annually to the Kenyan economy (Motorcycle Assembly Association of Kenya, 2018). According to Omondi (2015), the industry contributes around Ksh 146 billion Kenya shillings annually to the economy and around Ksh 2.2 billion to the exchequer.

One of the objectives of the "Big Four" agenda is employment creation. The agenda is anchored on the Kenya Vision 2030 and the National Automotive Policy 2012, and it intends to create 1.3 million jobs for the youth annually during the Medium-Term Plan period 2018-2022. This can be achieved through the manufacturing umbrella of the big four agenda under which automotive and TTW manufacturing and assembly sub-sector is categorized. It also addresses enhancing Motor Vehicle and TTW assembly jobs to higher productivity and mitigating informality of jobs. The Kenya National Industrialization Framework 2012 advocates for diversification and expanding of the automotive assembly sector by promoting Completely Knocked Down (CDK) units instead of Completely Built Units (CBU).

Despite the improvement on regulation efforts in TTW segment, passengers still experience access difficulties and health inequities (Delbosc and Ralph, 2017). There are concerns on personal safety, road traffic, injury risk and reckless driving. This includes lawlessness and failure in the part of operators to adhere to safety rules, which has led to loss of many lives in an industry that has directly employed many youths than any other in the services sector. The public sector transport is characterized by long waiting-time before departure in urban areas, lengthy travel times due to traffic jams in urban areas and deteriorating road conditions in rural

Kenya. There is inadequate feeder transport, low degree of vehicle punctuality and fluctuating tariffs and bus fares. In *boda boda* and *tuk tuk* most drivers lack proper training or driving license.

Informality is one of the consequences of the TTW segment, and this impairs the face of public transport. This informal status is characterized by untrained riders who lack proper documentation, attire and rarely uphold riding regulations. This contributes to road accidents with serious injuries or fatalities. According to the 2019 economic survey report the number of traffic accidents increased by 15.5 per cent from 4,452 in 2017 to 5,144 in 2018. The number of deaths resulting from road traffic accidents increased by 8.0 per cent to 3,153 while the number of persons who sustained serious injuries increased by 18.5 per cent over the same period (KNBS, 2019).

Opportunities exist in growing the TTW to complement matatus, the most common means of public mass transport in Kenya (Avner and Lall, 2016). This is because 83 per cent of all trips include walking as the major or secondary mode of travel. Forty-one (41) per cent of all trips in Nairobi are walking only, while 42 per cent involve other modes (Avner and Lall, 2016). The overall average travel time per trip in Nairobi is 47 minutes, while average travel times for motorized modes is between 54 and 60 minutes per trip (excluding motorcycles, which average 38 minutes per trip) (Avner and Lall, 2016). According to the World Bank (2016), increasing average commuting speeds from the average recorded 13.5 kph to 20 kph would save US\$ 54.1 million per year and decrease time spent travelling by 30 per cent. TTW can address these challenges as their travel times are faster, minimize traffic jam due to easy maneuverability and boost employment creation.

The general objective of this study is to assess the potential opportunities for employment creation for the youth along the value chain of the TTW segment of transport. The specific objectives are: First, to identify and map the TTW transport value chains and their contribution to job creations; Second, to identify key constraints to growth of the TTW transport segment; Third, to assess the employment creation potential along the TTW transport value chains; and lastly, to analyze the labour skills gap in the TTW segment.

The rest of the paper is organized as follows: Section 2 outlines the policy, legal and institutional framework, literature review is discussed in section 3. Section 4 provides a detailed analysis of the methodology, including conceptual framework, value chain mapping, data sources, variable types, employment elasticity method and skills gap analysis. Section 5 contains the discussion of results while conclusion and policy recommendations are outlined in section 6.

2. Policy, Legal and Institutional Framework

In Kenya, the transport operation is guided by various policies and regulations. Under the Constitution of Kenya (2010), transport is a basic human right since it contributes to the requirement of Article 54(1) (c), which provides for reasonable access to all places. The constitution in line with devolution gives powers to the County governments to oversee transport: public road transport and street lighting and parking with regard to county roads. The role of the county in regulating public transport within their jurisdictions is further empowered by the County Government Act, 2012 (No. 17 of 2012). Founded under Chapter eleven of the constitution, this Act of Parliament gives counties powers under Section 104(1) to initiate County Integrated Development Plans (CIDPs), which is very significant in enhancing development of local transport and the urban land use at the county level – plans that guarantee efficiency in the TTW segment in line with Integrated National Transport Policy (INTP).

Within the counties, the Street Adoption Act (Cap 406) also regulates the construction and improvement of street lights within counties. Revised in 2012 to conform with the 2010 constitution, the Street Adoption Act is very important in providing a conducive environment for the operation of both the transport sector in general and specifically to TTW, which is majorly preferred by urban residents. For effectiveness in the management of roads and to facilitate efficiency, the Government introduced the Kenya Roads Board Act 2007, which was a revised version of the 1999 Act. This Act established two authorities: Kenya National Highway Authority (KeNHA) to be in charge of the national roads and services under part 2 section 3, and Kenya Urban Roads Authority(KURA) under part 2 section 9(1) to manage, develop, maintain and rehabilitate all public roads in cities and municipalities except where there are national roads. To enhance access, which is the major challenge leading to the upward registration of two-wheeler and three-wheelers, the Public Roads and Roads of Access Act (Cap. 399) guides the construction of access roads over and above provision of control measures against encroachment by those whose lands are adjacent to public roads.

The policy on transport sector is guided by the Kenya long-term development blueprint - the Kenya Vision 2030 - whose overarching aim is to make Kenya a globally competitive and prosperous country with high quality of life through transformation into an industrialized middle-income economy. Anchored in three pillars: Economic, Social and Political, the vision is to be achieved through Medium Term Plans (MTPs) currently under the Medium-Term Plan (MTP) III. Infrastructure is pivotal in accelerating productivity and the creation of over 3,000 direct jobs to the youths under manufacturing in the "Big Four" agenda. It is also significant for the attainment of the economic pillar, which emphasizes the

development of transport policies that increase trade and productivity through enhanced intercity mobility and access, especially in Nairobi which controls 65 per cent of the Kenya Gross Domestic Product (Opiyo and Mitullah, 2016).

The Integrated National Transport Policy of 2009 is another policy governing the sector regulation, planning and management by advocating for the efficiency, safety and accessibility of the transport system through collaboration and partnership with different players. Safety is thus very key in the operation of the TTW, which have been a blessing and a curse in the eye of the public because of the rampant loss of lives out of non-adherence to safety rules. The Fourth Schedule, part two of the constitution facilitated the National Urban Development Policy earmarking urban transport which is the epicenter of wheelers as an important developmental area. It further underscores the need for the necessary strategies to address transport challenges in the counties.

This was succeeded by the Industrial Survey and Promotion Centre in the 1980s, which was mandated to systematically promote industrial development as implied by Session Paper No. 1 of 1986 on Economic Management for Renewed Growth. Since then, much has been done in industrial development, including the Kenya National Industrial Policy in 2007. However, there was no policy on automotive and TTW and a draft of such policy was being developed in 2019. The previous policies did not adequately empower the TTW sector as automotives were a more prominent means of transport in Kenya. Currently, in the manufacturing space, an automotive policy that addresses both TTW and automotive sectors is being reviewed. The policy addresses aspects including creation of National Automotive Council to streamline the firm's management, reduce complete built up units (CBU) and increase Completely Knocked Down (CKD) units thus minimizing import and excise duty tax by 50 per cent (National Automotive Policy, 2012) and improve TTW local content manufacture from the current 6 to 30 components. The previous manufactures of components faded away due to structural adjustment and liberalization policies (Report on the Automotive Industry Policy of Kenya, 2018).

At the operation level, TTWs transport operation has been marred by a lot of challenges. To bring sanity in the sector, the Government formed the National Safety Authority (NTSA) in 2012. The increased fatalities associated with the wheelers led to the introduction of the NTSA's Motorcycle Regulation in 2015, this regulation which came to effect in January 2016 saw two-wheelers (*boda boda*) associated accidents attracting a fine not exceeding Ksh 20,000 or a jail term not more than six months (Muchui, 2016). Execution of these regulations remains the main challenge (Opondo, 2018) hence the collaboration between NTSA and the Ministry of Transport in 2016 that ushered in the establishment of Transport

and Safety Committees in all the 47 counties to spearhead safety and regulatory measures among motorcycle taxi riders. According to Japan International Cooperation for Development - JICA (2006), road transport which includes *matatus*, two-wheeler and three-wheeler approximated to contribute 51.2 per cent of all daily road trips in Nairobi City. However, the poor road network, poor intermodal connectivity coupled with unsafe transport which sums the urban transport influenced the desire to have in place policy that would influence an efficient transport system that minimizes travel times and reduces externalities (Opiyo and Mitullah, 2016).

In line with the constitution, counties have not been left behind in putting in place regulations to take care of the transport sector. For instance, Nairobi County developed Non-Motorized Transport under the Public Private Partnership between the county and the United Nations Development Programmes to emphasize on safety to road users' modes of transport notwithstanding. Taking cognizance of the two-wheelers (*boda boda*) and three-wheelers transport (*tuk tuk*) as the main mode of transport within the rural and urban areas of Vihiga, the County government of Vihiga has developed a draft *boda boda* policy to guide their operation and to address the associated safety concerns such as ethical behavior, training to get the requisite riding skills.

Gaps abound that the policy documents have not addressed; for instance, domestic manufacturing of the TTWs is yet to be achieved comprehensively. According to Megh Cushion Industries, there is need for local production, but quality metal remains a challenge as the locally manufactured steel are not suitable for construction, other than for motorcycle parts. The massive inflow of low-priced TTWs from India and China remains another challenge (Mai Fujita, 2008), which has weakened local assembling plants and manufacturing industries. This is because foreign industries excel in product innovation and keep their prices low and are accustomed to tight competition¹ In Kenya, the implementation and enforcement of regulations governing motorcycle and motorized TTW taxis has also presented challenges to the Government (Bishop et al., 2018). Most two-wheeler drivers possess no driving licenses, which has been attributed to rampant road accidents and poor driving skills. In Kenya, over 80 per cent of the drivers acquired riding skills informally through fellow friends. This results in little knowledge and skills for the riders and excludes passenger safety, insurance and requisite rule and regulations (Nasongo, 2015).

India where automotive industry forms the backbone of macro-economic growth has had various policies guiding the transport sector. The National Urban Transport Policy of 2014 emphasizes on planning a transport system to people rather than vehicles as has been the case in Kenya and other countries. The policy

1 <https://www.cato.org/sites/cato.org/files/pubs/pdf/pa032.pdf>.

focuses on providing a sustained mobility and access to all citizens. It emphasizes on urban transport as a key parameter at the transport planning stage, in line with India's Unified Metropolitan Transport Authority of 2008 (Gadepalli and Singh, 2018). However, according to the International Centre for Clean Transportation and Institute for Transport and Development Policy 2009 there is no specific regulation concerning both the two-wheelers and three-wheelers in India. This is because transport policies are geared towards enhancing mobility and access in public transport and not private modes of transport, such as the two-wheelers and three-wheelers.

3. Literature Review

3.1 Theoretical Literature

3.1.1 Relevance of TTWs for employment

The use of motorcycles as a means of transport emanates from the failure of governments to provide an organized and efficient public transport system (Kumar, 2011). With increased urbanization, the growth of these non-conventional means cannot be gainsaid; the uptake of the TTW as a mode of public transport has increased overtime in the Sub-Saharan Africa. Their ability to maneuver feeder roads and settlements with poor road network has made them the preferred choice for mobility and access in both urban and rural areas. Muhia and Bishop (2018) opine that motorcycles have eased movement of people by connecting them to their daily business and social networks. Because of maneuverability, two-wheeler and three-wheeler have not only lessened the distances travelled but also provided employment to many young people to operate as riders, either with owned or hired wheelers on temporary basis (Kumar, 2011) more so in the rural areas where it is a very popular mode (Muhia and Bishop, 2018).

Bishop et al. (2018) note that motorized TTW, despite playing a key role in bridging the gap of limited access to affordable transport, are also significant in employment creation for the jobless young men who hire the wheelers for regular income generation. As Kumar (2011) confirms, by the year 2010, the city of Lagos had 100,000 minibuses and 200,000 commercial motorcycles, which provided an employment to over 500,000 people. The youth form the majority two-wheeler operators (Nyachieo, 2015). While conducting a study on violation of right way, the United Kingdom found youths between the age of 20 and 39 years to be majority of the culprits. In Kenya, a study in Kitengela, Kajiado county found that majority (72%) of the *boda boda* (two-wheeler) riders were between the age of 20-29 years (Nyachieo, 2013). The youth are in no way illiterate because as Nyachieo (2015) confirms in her study on socio-cultural and economic determinants on *boda boda* motorcycle safety in Kisumu, majority of the riders at 54 per cent were literate with secondary school education. This compliments the National Youth Analysis Report of 2009, which indicated that the youth of ages 5-29 years are the main victims of unemployment in Kenya

3.1.2 Value chain analysis

The concept of value chain is an evolved theory subject to different authority and objectives (Gereffi, Humphrey and Sturgeon, 2001; Paper, 2009). This includes

Commodity Chain (1974) by Wallerstein, whose underlying theoretical foundation was the world systems theory and underlying concept entailed international division of labour, Value chain (1985) by Porter that emphasized on the value addition concept, and global commodity chain (1994a,1994b,1999) by Gereffi that shares a theoretical foundation as the Commodity chain approach. The most recent is the Global value chain (2001; 2005) by Gereffi and Kaplinsky and its bedrock theory is global commodity chains. A value chain is a tool for analyzing the relationship between various actors and activities (Bair, 2009) highlights geographical location, linkages between nodes of value adding activities, actor influence and role of institution linkages (Sturgeon, Van Biesebroeck and Gereffi, 2008) and consist of cross border inter-firm networks to markets (Sturgeon, Van Biesebroeck and Gereffi, 2008).

The Global Commodity Chain (GCC) focused on understanding how companies were reconfiguring their supply chains to source from lower cost locations around the world (Gereffi, 2011) and employ an explicit international dimension established four fundamental factors namely institutional framework, input-output, international and governance structure (Bair, 2009). The theory exposed the interlinkages of internationalization of production systems with a disintegrated geographical production locality. It elaborates integration of actors to markets and production with further analysis on chain drivers and policy orientation work.

Global Value Chain unbundles the production process into specialized nodes to be performed at different geographical locations to take advantage of specialized technology, cost, labor advantages and other factors (Ignatenko, Raei and Mircheva, nd). In the TTW sector, the structural nature of TTW design architecture, a change in one component often has an impact on other components (Novak and Wernerfelt, 2006). Due to changes in customers taste and preferences the complexity is mostly erratic (Sturgeon et al. 2003). This, among other constraints, creates bottlenecks in developing the TTW sector in Kenya.

3.2 Empirical Literature

A study by Humphrey and Memedovic (2005) analyzed the global automotive industry in which TTW is a sub-sector and its prospects of upgrading for developing countries and found that standardization of models across markets remained a challenge as the domestic component manufacturing industries faced multiple inhibitors. This resulted in developing countries buying TTW models from developed countries that have similar geographical terrain. The vital reason for enhancing the value chain in the global TTW industry was to develop a domestic component industry, reduce the balance of payment emanating from imports and

develop domestic industries through spillover effects. In Kenya, opportunities still exist in component manufacture including but not limited to exhaust pipes, filters, radiators, wiring harnesses, speedometer cables, shock absorbers and therefore replace costly imports (KAM, 2018; Sturgeon and Biesebroeck, 2011).

A study by Sturgeon and Biesebroek (2000) on Global Value Chain (GVC) in the automotive industry with a bias on TTW asserts that in developing countries, vehicle design and development required more than 30,000 engineering hours, three to five years to complete, several billion dollars in investment and required a decade or more for international credibility. However, due to tapping the global chains, firms can establish themselves within a short time. To develop the much-needed local input and parts node including engines, gear box instrumental panel among other affiliations and leveraging to global chain partners will be required. The challenges of meeting both local and global quality specifications and standards needs addressing. Literature also shows that in 1999 there were less than 7 firms in developing countries manufacturing TTW. However, the number has doubled since then because of growth in GVC.

A study on Vietnam wholesale and retail industry by World Bank (2016) and Nguyen (2019) included sale of motor cycle, maintenance and repair of motorcycle both under section G of Vietnam standards of classification G451 and G452 elaborated that average wage by ownership type was higher in wholesale than retail business, therefore explaining higher dealerships in the TTW industry. The results depicted there was a gradual increase in wholesale and retail business in all regions across the country with urban areas experiencing faster growth compared to rural locations. In Kenya, most dealerships and distributions are owned by citizens with a foreign origin especially Indians, and above the age of 35 years. Capital intensity and size significantly influence the wages in retail or wholesale business. Capital intensive wholesale firms also tend to offer better quality remuneration and benefits.

A study by Bishop et al. (2018) on safe and sustainable transport for rural communities in Africa shows that most of wheeler-riders were aged between 20 and 30 years. The study was conducted in four African countries with Tanzania and Kenya being some of the countries. The results showed that most operators (55%) had completed no higher than primary education and 7 per cent having completed university. About 54 per cent of the total riders were members of a two-wheeler motor-cycle association. In terms of accessibility, it was reported by majority (97%) that TTW are accessible and convenient. However, 42 per cent of the passengers were concerned of their personal safety as 21 per cent held the view that two-wheelers are prone to crashing. The net average profit for the rider was Ksh 2,685 per week.

The TTW segment in Kenya is still in a developing stage, with the components of manufacturing sector being still frail. A study in Kitengela, Kajiado County found that 72 per cent of the *boda boda* (two-wheeler) riders were between the age of 20-29 years (Nyachieo, 2013), with low literacy rates (Nyachieo, 2015) confirms in her study on socio-cultural and economic determinant on *boda boda* motorcycle safety in Kisumu, that majority of the riders at 54 per cent were literate with secondary school education. This compliments the National Youth Analysis Report of 2009 which indicated that the youth of the ages between 15-29 years are the main victims of unemployment in Kenya.

Studies on TTW operation indicate that the sector has created jobs and alleviated poverty (World Bank, Nyachieo,2015, Bishop et al., 2018). The TTW are used for commercial and private activities. They carry goods, ferry people and provide positive multiplier effects such as accessibility and additional investment. The TTW backward and forward operation linkages employ motorcycle mechanics, spare part dealers, registration and licensing agents and firms and petrol operators. The sway being cheaper repairs, management and flexibility. Literature also shows that the living standards improved as the number of TTWs increased compared to before.

Bhorat et al. (2019) for instance use GDP data for South Africa and with Quarterly Labour Force Survey (QLFS) to compare labour to value added ratios for different sectors in South Africa. The results from this analysis show that the lowest ratios are found in: mining and quarrying; electricity, gas and water supply; transport storage and communication; and financial services. The highest ratios are found in community, social and personal services, and construction.

4. Methodology

The global value chain methodological framework addresses the objectives of this study by analyzing each node individually and uniquely. Due to data challenges for the TTW, different data sources and variables are analyzed. The data was analyzed for ISIC and KNOCS codes from KIHBS data. These identified the key actors and players at various nodes of the global value chain. The age variable was utilized to define youth and education level, hence crucial in determining the skills gap through education level.

The attribute of using different tools at each node of the value chain makes the global value chain the most suitable method for different types of analysis. The study uses value chain analysis approach to map the activities, employment elasticity approach to estimate the potential for job creation and skills gap analysis. Estimating skills demand and supply is essential in determining the skills gap analysis while arc elasticity shows the effects of individual employment on level of output. Employment elasticity was determined through arc elasticity method. These diverse methods combined with data from KNBS statistical abstracts explain the results.

The skills gap analysis is the difference between skills available and skills required. It analyses the skills available and skills lacking in the TTW segment value chain. The skills gap is analyzed per the value chain nodes. The tools to assess the labour skills is a prerequisite for the TTW segment. A key aspect is labour demand, which is determined.

4.1 Analytical Framework

A value chain approach is used as it describes the full range of activities that are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky and Morris, 2001). The framework entails value addition to a flow of products from raw materials to finished goods. Value chain analysis incorporates different sectoral backward and forward linkages, and in this way accounts for the dynamic linkages within and among various related sectors (UNIDO, 2009). It comprises of imports of TTW parts, distribution, assembling, wholesale or retail activities and ancillary services. In this study, we used more descriptive and qualitative approach as emphasized by (Kaplinsky and Morris 2001).

The paper undertakes different analysis as per the specific node of value chain requirements. This emanates from the necessity of mapping the value chain and illustrations of activities. Employment elasticity is a methodology used to determine the labour growth potential.

Employment potential was computed as $\varepsilon = \Delta\varepsilon/\Delta\varepsilon/\Delta Y/\Delta Y$, where $\Delta\varepsilon$ represents change in employment and ΔY represent the change in level of output in the manufacturing and assembly sector. This shows the extent to which employment changes given the change in the contribution of TTW segment to the economy.

The method uses time series data on employment and contribution to GDP, value addition or level of output. In the study, the input output approach will not be used because the labour to value added ratio was lacking in the secondary data.

4.2 Data Sources

The data used is obtained from secondary sources, including but not limited to Kenya Integrated Household Budget Survey 2015/16 (KIHBS 2015-16). The KIHBS collected data from 24,000 households and covered all the 47 counties in Kenya. The study also used other sources of data, including KNBS Economic Surveys and Statistical Abstracts for various years. The World Bank Enterprise Survey 2018 provides essential information on various nodes, and the National Transport Safety and Authority data were also relevant in the study. Primary data was attained through a stakeholder forum by the Kenya Institute for Public Policy Research and Analysis to provide information on constraints and policy gaps.

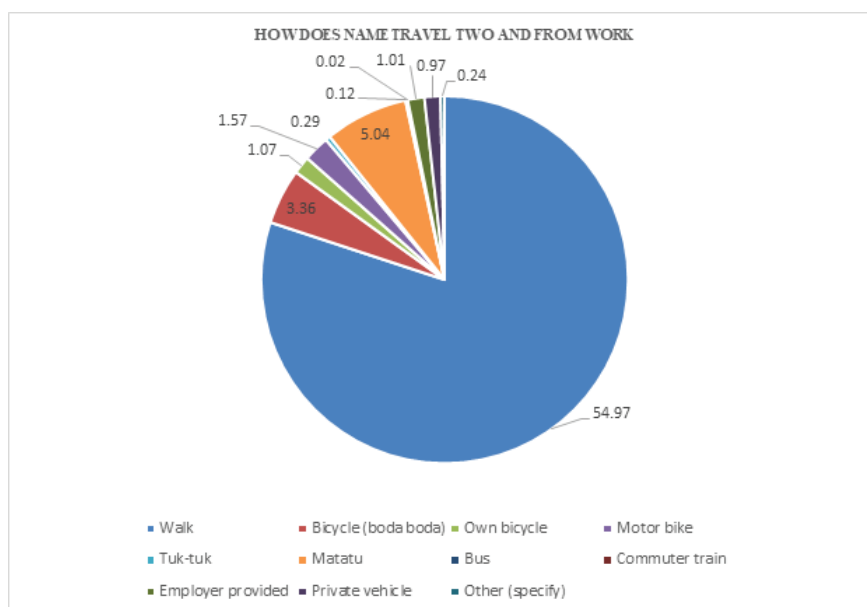
5. Results and Discussions

5.1 Descriptive Statistics

5.1.1 Transport design and earnings in rural and urban areas

According to KIHBS 2015/16, 55.9 per cent of commuters in Kenya walk to and from work. Only 5 per cent of commuters use *matatu*, 3.36 per cent use *boda boda*. A negligible percentage of 0.02 utilize the commuter train and 0.9 per cent use own vehicles (Figure 1). The use of three-wheeler is still not prevalent as only 0.29 per cent of the people utilize it. This can be attributed to the fact that 80 per cent of the Kenya population resides in rural areas while the rest live in urban and peri-urban areas. The rural areas are characterized by rough terrain and untarmacked roads that inhibit mobility especially during rainy seasons. Two-wheelers are commonly used in rural areas due to their easy of maneuverability while three-wheelers and matatus are common in urban areas. However, this does not imply that there is no two-wheeler in urban areas and vice versa.

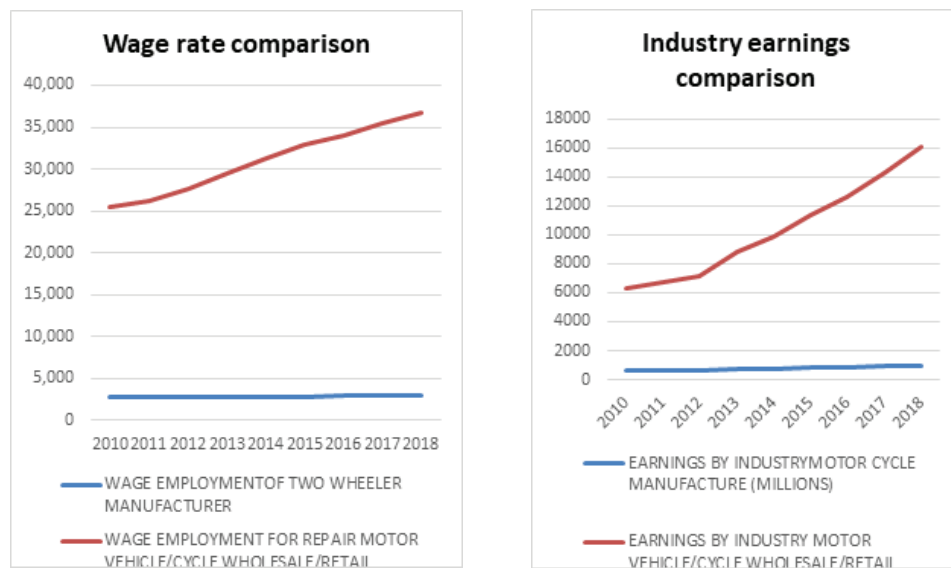
Figure 1: Means of travel in Kenya



Source: KIHBS 2015/16

According to KNBS (2019) Statistical Abstract, the average wage paid to an employee in the manufacturing industry in 2010 was Ksh 2,776 and increased to Ksh 3,001 in 2018. This shows a drastic improvement of 92.5 per cent on the increase of wages over that period. The general earnings by the two-wheeler industry also improved from Ksh 647.5 million to in 2010 to Ksh 990 million in 2018 (KNBS, 2019). The wage for repair of motor vehicle and cycle in wholesale and retail categories was Ksh 6,331.20 million in 2010 and increased to Ksh 16,041.70 in 2018 (Figure 2).

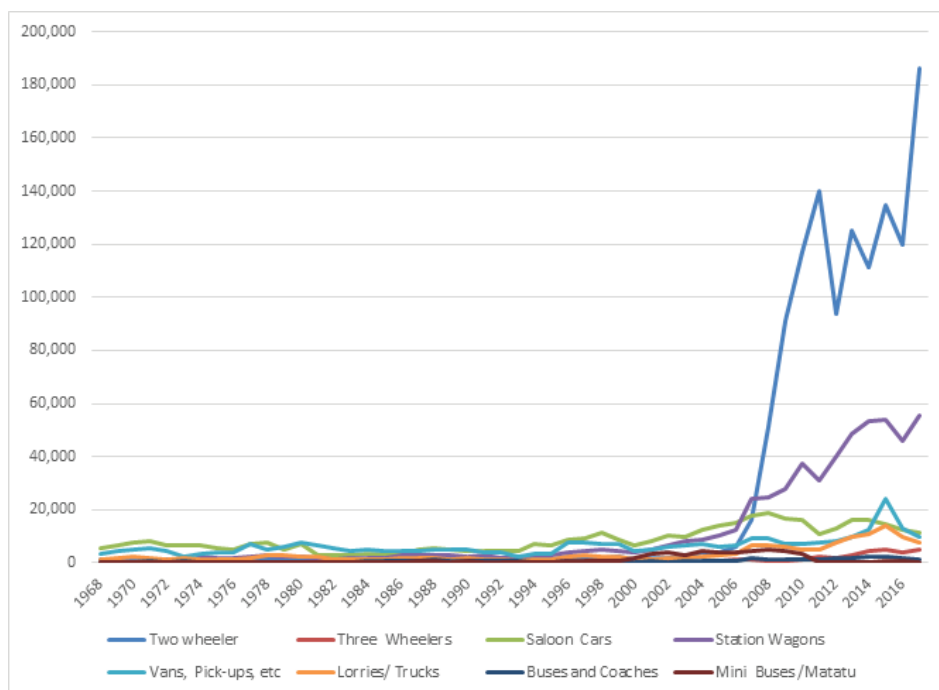
Figure 2: Two-wheeler wage rate and industry earnings



Source: KNBS (2019), Statistical Abstract

The transport sector contributed 8.0 per cent to the country GDP in 2019. Out of this, road transport contributed the highest at 5.5 per cent (KNBS, 2019). Road transport is characterized by buses, *matatus*, personal vehicles, the TTWs. Figure 3 shows the registration of different transport means over 40 years in Kenya. The two-wheeler curve surpassed wagon and salon cars (personal vehicles) after 2008 due to zero rating policy of motorcycles. Three-wheeler first attained a value of 1,000 units in 2005, then declined and thereafter rose in 2010. Personal vehicles have tried to establish consistency for a few years. This has always created a demand for petrol, with retail petrol outlet and road transport having the highest share of 72.8 per cent on total petroleum sales in 2018 (KNBS, 2019).

Figure 3: Registration of vehicles from 1968-2017



Source: Ogot, Nyang'aya and Muriuki (2018)

5.1.2 Employment potential of TTW sector

Import stage

Importation of TTW and their parts is mainly undertaken by franchise holders. Much of the demand of *tuk tuk* and *boda boda* is imported, since production is almost non-existent (Black and McLennan, 2016). The main importers in Kenya are Auto Industries, Car & General, Honda Motorcycles, Toyota (Yamaha), Ryce E.A, KIBO, Captain, Makindu Motors, Abson Motors and BMG Holdings, among others (State Department for Industrialization, 2019).

Table 1: Sector Players and Actors

No.	Company	Brands or Franchise holder	% Mkt Share
1	Auto Industries Ltd	Bajaj	39.04
2	Car & General	TVS	21.29
3	Captain Motorcycles	Captain, Tiger, Dayun	13.39
4	Honda	Honda	7.67
5	Makindu Motors	Skygo	7.03
6	Abson Motors	Haojin	4.75
7	Ryce E.A. Hero 0.99 8 T	Hero	0.99
8	Toyota	Yamaha	0.98

Source: *Motorcycle Association of Kenya (MAAK)*

The TTW assembly is part of auto vehicle production and assembly. It entails motorcycles production and assembly and automotive parts and component manufacture. According to the Kenya Association of Manufacturers and Kenya Business Guide Sector Report of 2018, there are 21 TTW assemblers in Kenya, 6 of which are assembly Completely Knock Down (CKD) models. Five (5) are the main motorcycle assemblers producing 55 different types of motorcycles. Some plants have a fully integrated manufacturing system involving design, component manufacture and assembly. The annual market for motorcycles is close to 125,000 units. The most prominent motorcycle dealerships in Kenya include: TVS, Yamaha, Hero and Suzuki. Motorcycle Assemblers, when combined, have an investment of over US\$ 10 million and an installed 150,000 motorcycles (KBG, 2018; KAM, 2018).

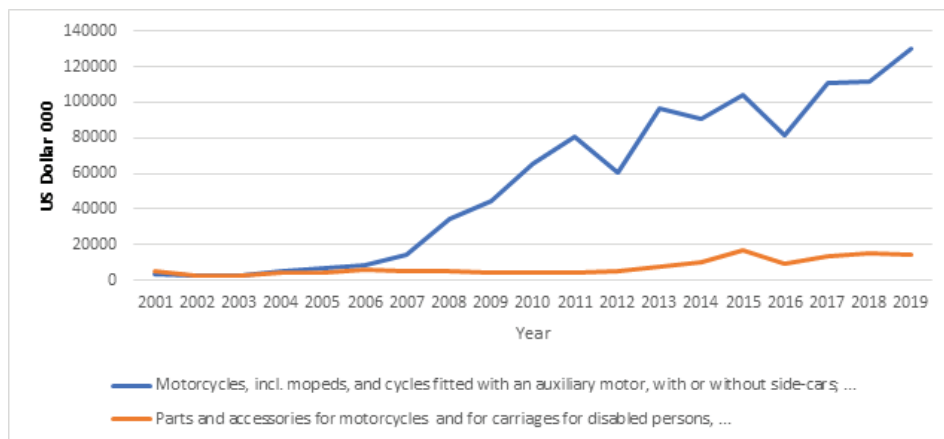
Currently, Kenya does not have a manufacturing plant for the wheelers, they are imported in parts before being assembled locally. However, it is worth noting that apart from the Car and General motorcycles that are exclusively assembled locally, some are imported as fully built units such as the Honda brands and the cheaper Chinese brands. The imported parts for local assembling of motorcycles are referred to as Complete Knock Down (CKD) kits, which are then transported for assembling.

At the importation stage, a number of employment opportunities exist. For instance, the cargo handlers and loaders at the ports of Mombasa are gainfully engaged, though informally. Opportunities are also created among the truck drivers who offer transport services of these parts to the plants in various parts of the country for further transformation to wheelers as the end products. In terms of clearance and forwarding, several people are employed through the many

established clearance and forwarding companies at the port of Mombasa. Freight forwarders, logistics, warehouse owners and operators, port authority officials and port operators are also direct and indirect beneficiaries in terms of employment.

Figure 5 shows that imports of motorcycles, mopeds and cycles fitted with auxiliary motors is higher than service parts for motorcycles. The blue line exceeded 18,000 million US\$ from 2006 onwards and peaked in 2019. This was mainly due to the zero rating of TTW imports in Kenya. The parts and accessories declined below US\$ 15,000 million in 2007 as Kenyan firms scaled up part manufacturing and high quality TTW were imported, hence minimal service and repairs are required in the first few years.

Figure 4: Import value for wheeler spare parts



Source: International Trade Centre

Wheelers at the assembling plant

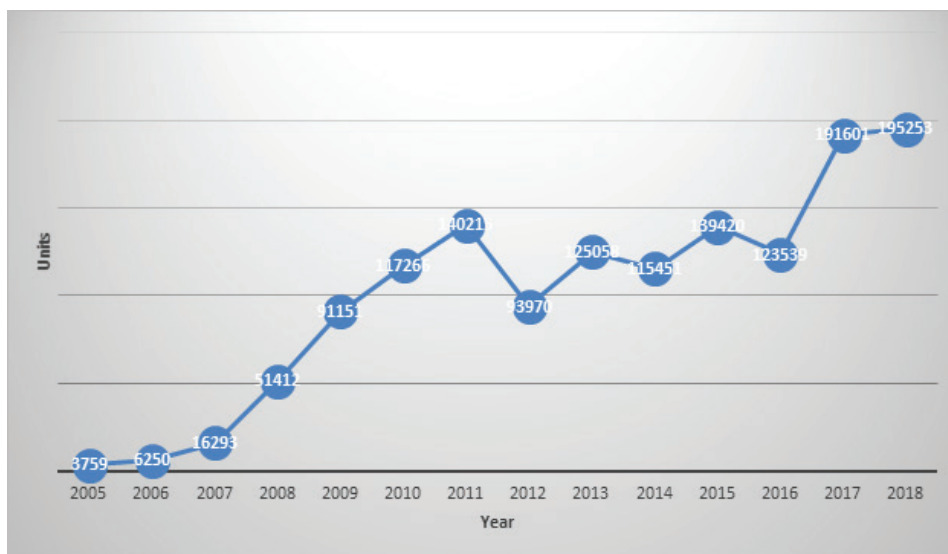
Once the motorcycles and autocycles parts are imported, they are transferred to the assembling plants for further transformation from the Complete Knock Down (CKD) kits to the final product, which is the wheelers. At this point, the labour from the mechanics, electricians, machine operators and casual labourer are needed. However, assembling mainstream assembling plants such as Car and General housing TVS in Nakuru, which rely on technology to put together the motorcycles employ machine operators majorly. Kenya does not have a full-fledged Motorcycle Mechanic Training institution like in developed countries to train motorcycle assemblers and mechanics, specifically for the wheelers. The sector, therefore, relies on fresh graduates from the technical institutions who acquire on-the-job training.

According to the Kenya Trade Network Agency (2019), the main assemblers in Kenya are the India Auto Maker, Bajaj Auto which manufactures Boxer brand controls 39 per cent of the market share. Car & General which house TVS control 21 per cent of the market share followed by Honda Motorcycle Kenya Limited which manufactures the Honda brand. Other are Ryce Africa which houses Hero model and Toyota Kenya which assembles the Yamaha. Car and General can produce 240 motorcycles in a day through the 14-stage assembly line and employs 40 people.

Wheelers at transport services operation

This is the last node of the entire value chain, and a big number of youths are employed under this node. Data from the National Transport and Safety Authority as shown in Figure 6 shows that 1.4 million motorcycle are operated in Kenya. This offers very significant employment opportunities which KNBS and the MAAK further posits supports 4.8 million people who depend on it directly and indirectly.

Figure 5: Registration of motorcycles

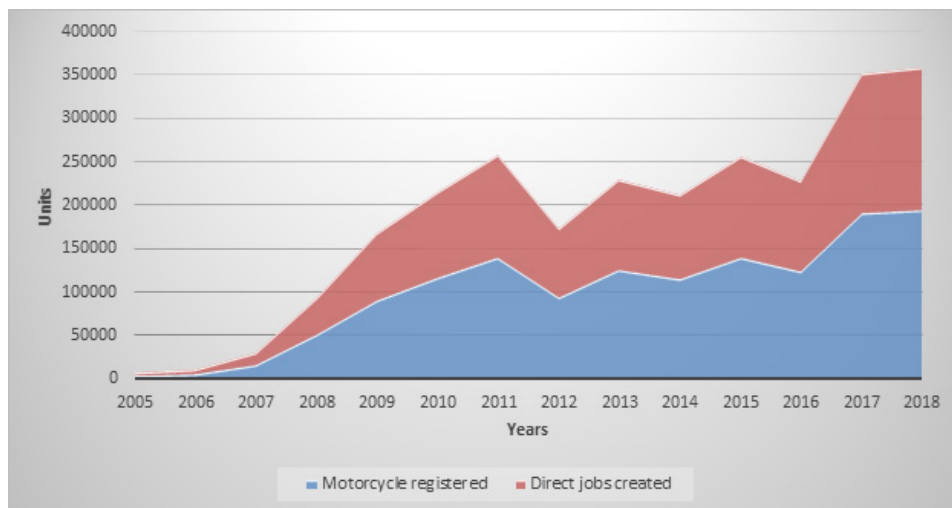


Source: KNBS (Various), Statistical Abstracts

From the study, the registered motorcycles in the country stood at 16,293 in 2007. There is significant increase in registration over the years, with the latest data of

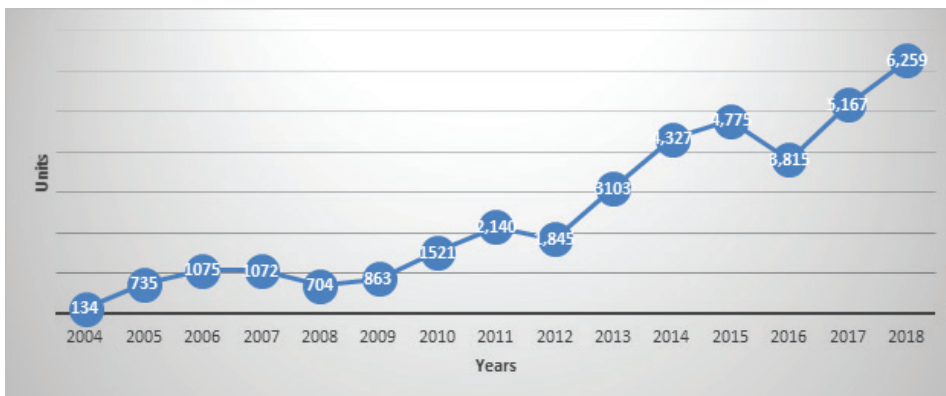
2019 showing a registration of 195,253 motorcycles (KNBS, 2008). Cumulatively, Kenya has nearly 1.4 million motorcycles in operation, and according to the Motorcycle Assemblers Association, 8 per cent of the registered motorcycles are operated by courier companies and another 8 per cent for personal use, with the remaining 84 per cent (which translates to 1.2 million motorcycles) being for commercial use. With the ratio of one motorcycle to one rider, nearly 1.2 million are currently employed directly in the sector as riders. Figure 6 shows a comparison between the motorcycles registered annually and the direct jobs created.

Figure 6: Motorcycles registration and jobs created



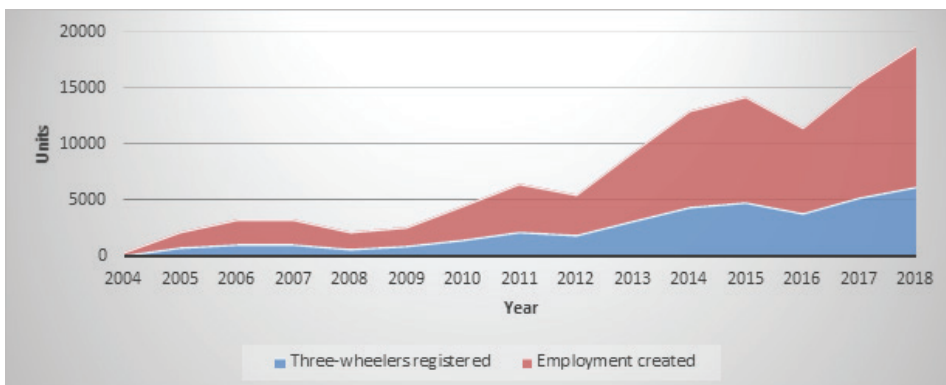
Source: KNBS (Various), Statistical Abstracts

The number of three-wheelers has also been increasing over time, though not as significantly as *boda boda* as shown in Figure 8. The findings show that growth in use of three-wheelers has been exponential, from a paltry 134 registered wheelers in 2004 to 6,259 wheelers registered in 2009. This growth has seen 37,535 three-wheelers registered in Kenya between the year 2004 and the year 2018.

Figure 7: Registration of three-wheelers

Source: KNBS (Various), Statistical Abstracts

Comparatively, the increase in use of three-wheelers has seen the rise in number of registrations. Unlike two-wheelers which are partly used for personal use, three-wheelers are purely commercial. They are operated by a maximum of two people, the driver and the conductor. A new three-wheeler registered is a direct job created for two. Besides public transport, three-wheelers are also used by the soft drink companies to transport their products. Figure 8 shows cumulatively, the sector has employed 75,070 people since the year 2004.

Figure 8: Registration of three-wheelers vs direct jobs created

Source: KNBS (Various), Statisticals

The sharp increase in the registration of wheelers from 2005 can be attributed to the action of the Government in zero rating taxes of cycles below 250cc in 2008. Writing on the youth employment in Kenya, Hall(2018) concurs that the informal transport industry in Kenya is a preserve of young people who have struggled to save money to buy motorcycles to earn a living from enhancing mobility in poorly

networked areas in Kenya, more so the disadvantaged urban neighbourhood. This action by the government created opportunities for the youth's, majority of whom are the operators in the two-wheelers and three-wheelers industry.

Wheelers ancillary services

Apart from the four nodes, there are also certain ancillary services that are directly and indirectly interlinked within the TTW value chain. According to the NTSA Operation of Motorcycle Regulations 2014, every operator needs to have a third-party public vehicle insurance cover. This was necessitated by the increase in number of fatalities associated with wheelers. With this requirement, many entities have come up with covers; for instance Equity Bank has *Bima ya boda boda and Tuk Tuk* offering comprehensive cover of Ksh 9,000 annually and up to Ksh 3.5 million per person in case of a fatality; Kenya Commercial Bank and Xplico Motorcycle insurance, among others. These ventures have also created avenues for employment to the skilled in the insurance field.

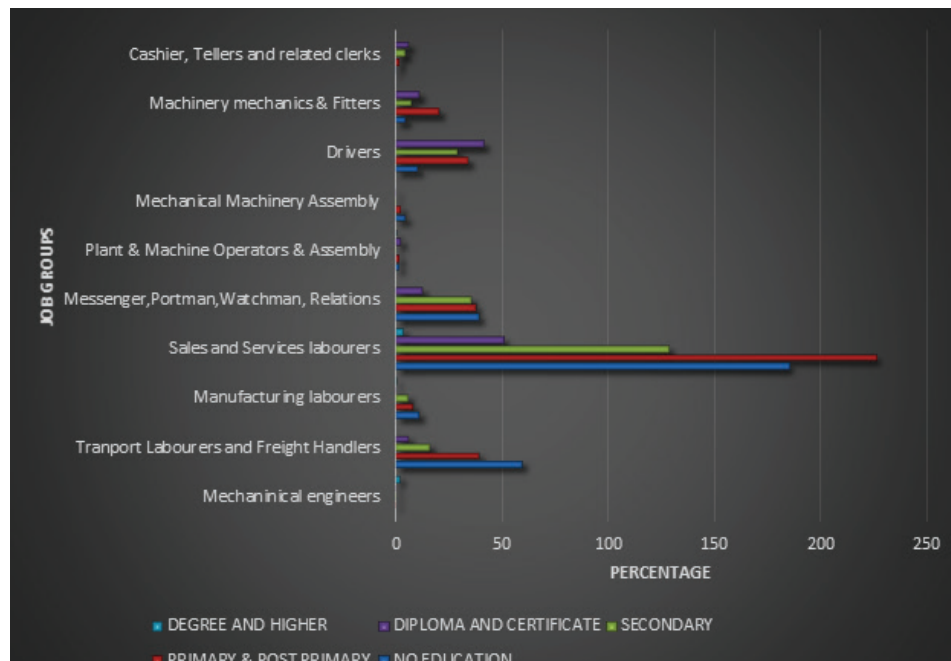
Another policy that has provided job opportunities, though a times informally, and also expanded the financial base of the wheelers operators is the savings and credit cooperative societies. NTSA requires one to operate motorcycle only when registered as a SACCO member. Though it was meant to bring sanity and easy regulation of an industry marred by lawlessness, the policy has become a social safety net; members have used their savings to buy more cycles, which they have in turn to employ other youths as riders. Others, have improved on their financial savings and received loans and dividends daily, which has been significant in supporting their families. Most importantly, some SACCOs have offered employment to some members over and above savings to the mainstream financial institutions, which is a significant contribution to the economy. Through SACCOs, the industry has used the opportunity to mobilize their members to be enrolled on the health insurance schemes such as NHIF. Running the SACCOs needs employment of those with financial management and record keeping skills to train riders on savings and access to credit facilities. These skills are lacking among the youths, since SACCOs are often run by members.

Despite the lapse in the execution of the NTSA regulation on training as a precursor to safety driving, some riders have gone for the training as required while others opt to self-train. Lack of specialized and affordable training institutions run by NTSA has resulted to sprouting of uncredited ,though affordable, institutions in different counties to bridge the training gap. In the process, employment in form of training instructors is created.

5.1.3 Identification of skills

Level of education is used as a proxy for skills. Figure 9 represents the different levels of education of value chain players. The transport labourers and freight handlers are located on the import node while mechanical engineers, manufacturing labourers, machinery and assembly are located on node 2. Sales and services labourers are located on the retail and wholesale node. The graph depicts that sales and services labourer are more educated at degree levels and higher and at the same time have the highest number of primary and post-primary education. The cashier and tellers have a minimum of secondary education and a high number possess diploma and certificate education. It is surprising to see that most transport labourers and freight handlers poses degree and higher level of education as per the data.

Figure 9: Education levels for TTW segments by job groups



Source: KIHBS 2005/06

An impediment to the growth of jobs is the persistence skills gaps in the TTW sector. These disparities are a result of differences in skills required and existing skills in the sector.

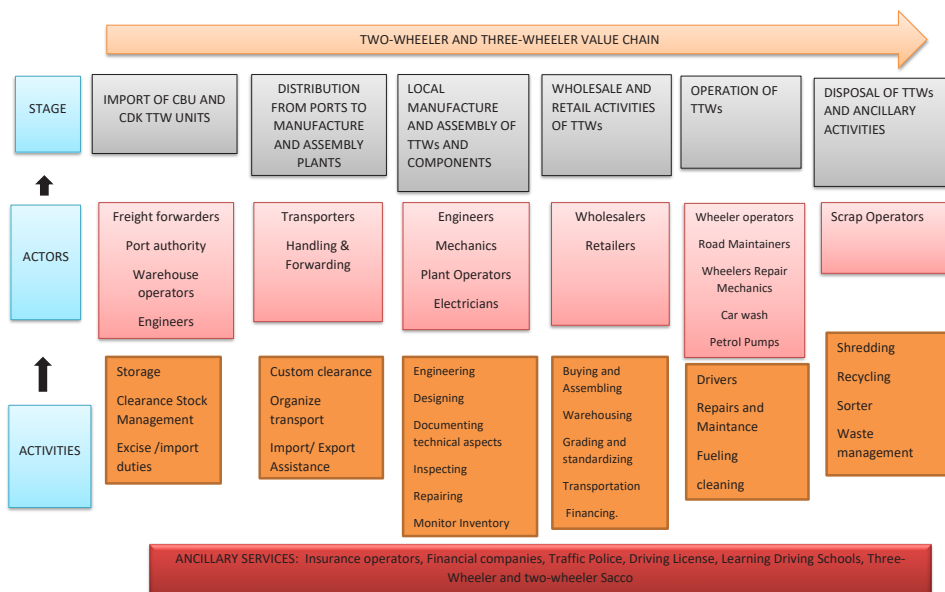
5.2 Global Value Chain for Motorized TTW

Many aspects of TTW exports and imports, operations, marketing, design and marketing remain decidedly understudied². However, Kenya is a lucrative market for TTW in East Africa given the recent growth trends in the industry. Literature reforms in local industries in developing countries has been impacted by the global value chain due to affiliation with global firms. Figure 10 presents the global Value Chain for Motorized TTW, which is further discussed by node in the section that follows.

Import activity

Kenya is the largest importer of two wheeler in Africa (Mtanga & Mccamel, 2019). The data from KNBS statistical abstracts shows the value of two-wheeler, rubber tyres and tubes imported to Kenya in 2010 stood at Ksh. 5195, 89 and 60 million respectively. The imports increased to Ksh 11,300 million for two-wheelers, Ksh. 729 million for rubber tyres and Ksh. 322 million for rubber tubes. This did not, however, correspond to increase in number of jobs at the import node as the Kilindini harbour and port underwent mechanization, digitization and improved technologies during the period. Due to data challenges, the disaggregated values of import parts are unavailable. The import sector has been progressive due to the bulging demand and infant TTW service parts manufacturing sector in the country.

Figure 10: Global value chain for motorized TTW



2 <https://doi.org/10.1080/17450101.2012.659466>

Assembly and distribution

There are over 20 motorcycle assembly plants in the country (Mtanga and Mccamel, 2019). The TTW assembly segment is characterized by experienced distributors and franchise holders whose main model of operation involves importing of complete knock down TTW kits. They possess licenses to import parts and knock down units and assemble them on account of TTW manufacturers from Japan, China or India. The companies include but not limited to Car and General, Auto Industries, Captain Motorcycles, Honda and Makindu motors. An extra division in the TTW assemblies are independent firms that furnish spare parts to these assemblies. However, for lucrative import contracts most franchise holders import complete CKD units. A few of the distributors and wholesalers are also franchise holders. However, most distributors are outlets for franchise holders.

Wholesale/Retail

The wage employment in wholesale and retail trade, repair of motor vehicles and motorcycle exhibited a 5.8 percentage points increase for the past five years between 2014 and 2018. In 2014, the sector earned Ksh 218.9 million and Ksh 258.9 million in 2018. The Average wage per employee per annum increased from Ksh 519,429.6 in 2014 to Ksh. 742,485.4 in 2018 (KNBS 2019). In developing countries such as Kenya business linkages are essential with local SME for distribution and sales (Okatch, Mukulu and Oyugi, 2011). However, the proportion of youth owning retail or wholesale dealership is negligible to none as most key informant interviews concluded that nearly all dealerships are owned by adults (non-youth).

Operations and disposal

The Motorcycle Assemblers Association of Kenya (MAAK) estimated 600,000 two-wheeler operators in Kenya ferrying around 21 million Kenyans in both rural and urban areas. The TTW value chain employs individuals aged between 18 to 35 years. The operations node is the strongest link to this chain.

Ancillary services

The repair and service shops of TTW can be categorized into formal garages and informal garages. The former provides better quality and relevant stable job compared to the later. The number of either formal or informal garages is estimated to contribute a higher level of wage employment in Kenya (KNBS 2019). Literature reveals that Bajaj and TVS are the most common serviced brand due to their huge numbers and more than 70 per cent of the mechanics have above grade 1 level of training. Data on numbers of garages in Kenya is scanty but every TTW garage employs more than 2 people for both formal and informal businesses. The

sector forms backward linkages to retail parts suppliers, which are commonly sole proprietors. Youth are dominant players in this industry in terms of ownership and proprietorship.

5.3 Constraints Analysis

5.3.1 Constraints at importation of TTW

According to the National Automotive Policy (2019), the importation of TTW and their parts are mainly done by franchise holders as opposed to procuring from local parts manufacturers. This denies the later opportunities for growth and enhancement of local content. The problem lies with the poor quality of parts from local manufacturers. In some instances, used completely built up (CBU) parts and components are imported. This affects market volumes resulting to additional environmental degradation and emissions. Other research has also indicated presence of low quality or counterfeit imported products in the domestic market.

Another challenge with importing is depleting of foreign exchange reserves and importing of used TTW at high volumes to an extent that it is difficult to sustain local assemblers and parts manufacturers. The duration it takes for a container to be cleared and shipped has reduced, though much more could be done. According to the Car Importers Association of Kenya, the influx of multiple brokers in the import and export process has influenced TTW value by lowering the margin. The brokers usually poach aspiring customers, then introduce them to dealerships for a commission. They can claim between Ksh 20,000 to Ksh 50,000 for a purchase depending on value of TTW.

5.3.2 Constraints at the assembling plant

Assembly plants are a key node in the value chain. The geographical spread of vehicle output and sales in developing countries has not been accompanied by a spread of ownership in the assembly sector. Globally, the auto industry remains concentrated, with a small number of companies accounting for a significant share of production and sales (Humphrey and Memedovic, 2005). In Kenya, representative companies include car and general TVS, Bajaj and *tuk tuk*. Kenya offers multiple advantages for three-wheeler assembling as its less prominent than *boda boda* because of the growing domestic market and low-cost production sites.

The high cost involved in acquisition of technology for manufacture of spare parts and machine tools is amplified by high cost of finance and inadequate training for

small scale informal operators in manufacturing. The quality of skills required for operating this machine is inadequate or unavailable.

Low research and design development: Most assembly and manufacturing companies lack a unit for research and development. In Kenya, basic components that require basic technology are produced; these include side stand, crash guard, pillion handlebar, right third rider footrest, left third rider footrest, and centre stand. More research and design development is required to produce air cleaner filter, harness, seat, chain case, battery, rear fender, front fender, and tubes/tyres. Global Original Equipment Manufacturers (OEMs) are increasingly moving away from component manufacturing and focusing more on their own brand, marketing and distribution channels. This gives opportunities to the OEMs to build capacity locally for component manufacturing (State Department for Industrialization, 2019).

Inadequate supportive legislation and regulations: The motorcycle assembly industry is operating at about 50 per cent capacity (State Department for Industrialization, 2019). Among the constraints is lack of access to incentives for CKDs, and promotional regulations.

5.3.3 Constraints in wholesale and retail

Wholesalers and retailers add value of a product, increase market accessibility of products and enhance demand. However, the emergence of online motorcycle retailers and wholesalers has affected sales as they lack warehouse and staff expenses unlike their counterparts.

The wholesale and retail dealerships are owned by adults with youth representing a negligible percentage of proprietorship. This is due to high cost of initial, working and expansion capital required, which the youth cannot afford. Literature also shows that the youth account for less than 5 per cent of the employees in East Africa countries TTW wholesale and retail dealership due to low remuneration in comparison to other occupations in the same job group. The nature of payment, which is based on commissions, is also a challenge. The turnover rate on TTW dealership was highest among youths.

There is no regulation on specified duration a TTW should be written off as for other automotives. As a result, road unworthy two-wheelers and three-wheelers are still in use and this increases environmental pollution and affects sales. Literature shows that less than 10 per cent of the youth are owners of retail and wholesale firms in Kenya. This is due to large initial capital outlay required to set-up an entity.

5.3.4 Constraints in the ancillary activities

The service and repair sub-sector has the highest potential for youth employment. The number of trade tests passed by motor vehicle mechanics increased from 7,124 individuals in 2010 to 7,249 in 2014. The numbers then reduced to 6,511 in 2018 for aggregate grade 1, 2 and 3 motor vehicle mechanics (KNBS, 2019).

More than 80 per cent of the roads in Kenya are unpaved (Kenya Roads Board, 2012). The roads become inaccessible during rainy seasons due to landslides, floods and mud. These dilapidated roads have been a major cause for road accidents, together with reckless driving and training.

Motorcycles are serviced quite often (Okonda et al., 2015) hence availability of qualified and efficient mechanics and spare parts is mandatory. The mechanics operate informally, hence they are paid low wages and often lack social benefits such as: leave, social security and medical insurance. At times, the mechanics have no proper training and possess only on-the-job experience.

Legislation regulates that all two-wheeler and three-wheeler riders be registered with an association. However, not all are registered, and this poses a major challenge to monitoring in case of accidents, regulation enforcement or criminal activities by the owners. The associations liaise with stakeholders and assist in providing training and health insurance.

5.4 Employment Potential in TTW Segment

The employment elasticity is computed using the arch elasticity method. The elasticity shows a correlation between employment demand, with changes in output in the TTW. According to literature, changes in output in a sector result to either direct or indirect proportion changes in employment. The variables used to compute arch elasticity are employment numbers and level of output. The challenge of this method, according to the framing paper, is historical trends. Employment elasticity of the current times do not depict effects on employment after addressing the constraints or growth in which job growth will be enhanced.

The results imply that there is a positive correlation between increase in output and employment from the year 2010 to 2018 (Table 2). The employment elasticity was highest in 2012 with a value of 23.75, implying that the level of employment increased with the increase in volume of output and GDP. However, the value of change in employment and change in output were both negative.

Table 2: Computation of TTW employment elasticity

YEAR	Average Wage Employment	$\Delta E/E$	Output	$\Delta Y/Y$	$\Delta E/E/(\Delta Y/Y)$
2010	2,776		647.5		
2011	2,852	0.02	651.9	0.01	4.03
2012	2,795	-57	649.5	-2.4	23.75
2013	2,844	49	743.6	94.1	0.52
2014	2,945	101	761.5	17.9	5.64
2015	3,001	56	828.2	66.7	0.83
2016	3,040	39	889.7	61.5	0.63
2017	3,050	10	938.8	49.1	0.20
2018	3,068	18	990	51.2	0.35

Source: KNBS (2019) Statistical Abstract

5.5 Sectoral Skills Gap Analysis

The study results show presence of skills surplus in the TTW segment for various levels of education. This implies that most of the unemployed youth have the minimum required skills to secure a job but lack employment. The expertise depicted are 2,691,081 for no education, 1,960,555 for primary and post-primary school, 666,074, 185,084 and 28,741 for secondary, diploma and certificate and degree and higher education, respectively, as shown in Table 3. The skills availability ratio also exhibits a positive value with the highest being 563 for primary and post primary education and lowest being 526 for no education with a median of 550.11 for secondary education. When the ratio is lower than 10, it means that the skills are not easily available, and the sector is not appealing to employees. However, in our study the ratio is abnormally high, implying the sector is very attractive and the skills are easily available.

Table 3: Estimate of the TTW sector skill gap.

	NO EDUCATION	PRIMARY & POST PRIMARY	SECONDARY	DIPLOMA AND CERTIFICATE	DEGREE AND HIGHER
Skills supply (S)	2,696,202	1,964,041	667,287.40	185,300	28,794
Skills Requirement (D)					
	5,121	3,486	1,213.0	300	53
Mechanical engineers	0	1	1	1	2
Transport labourers and freight handlers	60	40	17	7	0
Manufacturing laborers	12	9	7	1	1
Sales and services laborers	185	226	129	51	4
Messenger, portman, watchman, relations	40	38	36	13	0
Plant and machine operators & Assembly	2	2	1	3	1
Mechanical machinery assembly	5	3	1	1	0
Drivers	11	35	30	42	0
Machinery mechanics and fitters	5	21	8	12	0
Cashier, tellers and related clerks	1	2	5	7	0
Government tax and excise officers	0	0	0	0	1
License officials	0	0	0	0	0
Sectoral skill gap/ surplus (S-D)	2,691,081				
	1,960,555	666,074.0	185,084	28,741	
Skills availability Ratio (S/D)	526	563	550.11	618	543

Source: KIHBS 2015/16

5.6 Assessing the Labour Skills Gap in the Two-Wheeler and Three-Wheeler Transport Segment

5.6.1 Skills gap at the assembling plant

Every occupation whether formal or informal needs skills. A skilled workforce is not only significant for any industry but also enhances qualified labour (Krasniqi, 2019). Shortage of skills to handle digitalized machines is a challenge which hinders productivity. Often, when operations within the assembling plants are automated, the machines run on their own. This provides the need for skills to handle the machines, and these are lacking. However, over and above the mechanical qualification required, being computer literate needs to be employed to enhance on job training (Banga and Willem, 2018) given that those who have these soft skills are advantaged. Kenya does not have a full-fledged motorcycle mechanic training institution as in developed countries to train motorcycle assemblers and mechanics specifically for the wheelers. The sector, therefore, relies on fresh graduates from the technical institutions who acquire on the job training. In this era where countries are digitalizing manufacturing, some firms enter into after-sales support agreement when a new machine is imported to offer training on how to operate the machine (Kerishna and Velde, 2018).

5.6.2 Skills required in the operation of the wheelers

Just like any other occupation, motorcycle and auticycle operation have requisite skills and as ILO (2018) notes, streamlining the skills with every occupation enhances productivity and competitiveness. One of the major challenges in the motorcycle industry in Kenya is lack of skilled riders, which resulted in safety concerns (Karema et al, 2017). The National Transport Safety Authority (NTSA) outlines guidelines of operating the wheelers, with the main training being the key requisite for any rider. This training which is given in different categories must be done from an approved institution with the driving examination administered by the NTSA. As shown in Table 4, the minimum requirement for joining the training for operating the TTWs is 16 years and 18 years, respectively. Two-wheeler operator must have attained a minimum age of 18 years with a category A2 (Light motorcycle) training to carry a passenger and any load of a maximum 60kg.

Table 4: Training categories and minimum requirements

License Category	Vehicle in license category	Description of vehicle to operate and restrictions	Minimum requirements
Category A	Category A1 (Moped)	Enables one to ride a motorcycle up to and including 50 cc No passengers allowed to be carried. No loads	Minimum age 16 years No passengers
	Category A2 (light motorcycle)	Enables one to ride a motorcycle above 50 cc Carry a maximum load 60 kg (for up to 400 cc) Can carry a passenger	Minimum age 18 years
	Category A3 (motorcycle taxi , couriers and three wheelers)	Enables one to ride a motorcycle 100 cc and above. Carry a maximum load 100 Kg (for up to 50 cc) Can carry a passenger	Minimum age 21 1-year riding experience of category A2
	Category B1 (motorcycle taxi , couriers and three wheelers)	Can carry up to a maximum of 7 passengers Enable one to drive a light vehicle (passenger car) with automatic gear box with a maximum Gross Vehicle Weight (GVW) of 3,500 kg with one light trailer (not exceeding 750 kg) Cannot drive a vehicle equipped with a manual gearbox Can carry up to a maximum of 7 passengers	Minimum age 18 years

Source: KMA

To enhance safety in the wheelers' operation, training is a key component of the NTSA regulations to impart riding skills. However, studies shows that most riders in country have no training at all. Nyachieo (2015) conducting a study on socio-cultural determinant of *boda boda* safety in Kisumu found that 62 per cent of rider's majority (68%) were youth aged 18-31 years and had not attained any formal

training as required by the NTSA. This as noted by the National Crime Research Centre (2019) is attributed to lack of finance to cater for training costs due to their lower socio-economic status. It is important to note that NTSA does not have own school for training but relies on the driving entities, which charge between Ksh 6,000 and Ksh 9,000 for three weeks maximum. The riders resort to informal backstreet trainings which cost them between Ksh 50 and Ksh 200 (Nyachieo, 2015). The wheelers and especially the commercial motorcycle users (also referred to as *boda boda*) is the major contributor of the total income generated from road transport in Kenya. As shown in Table 4, *boda boda* contributes 85 per cent while three-wheeler (*tuk tuk*) contributes two per cent.

5.7 Challenges in TTW segment

That most of wheelers are not manufactured locally is a significant concern. The parts are imported in form of Complete Knock Down (CKD) kits for local assembling firms. However, the assemblers have to compete with cheap Chinese products which are imported as Fully Built Units.

The Motorcycle Assemblers Association of Kenya (MAAK), the Ministry of Industrialization, and the Kenya Association of Manufacturer initiated a project in 2017 to manufacture 5 parts out of the 290 parts of TTW that are usually imported. Honda Motorcycle and Megh Cushions teamed up for this venture. The parts included main frame, suspension, seat and seat frame, mud guards, wheel rims, brakes and gear exhaust pipes³ (Table 5). The bottlenecks affecting progress have been lack of quality metal locally and supplier in East Africa to supply the parts in required quality, cost and delivery standards.

Table 5: Sourcing by a company

Nature and source	Components supplied
China/India	Engine, gearbox, engine system and velocity joints
India	Steering bar, rear axle, rear brake, starter motor, wiring harness, instrument panel, seat, exhaust
India/China	Clutch, steering, brakes, rear suspension, fuel tank, headlamp, taillight, radio, wheels
Locally	Seat, seat frame, mud guard, wheel rims

Source: Literature

The capacity to produce locally is still a challenge. Car and General, one of the major assemblers of the TVS motorcycle model produces 70,000 bikes a year,

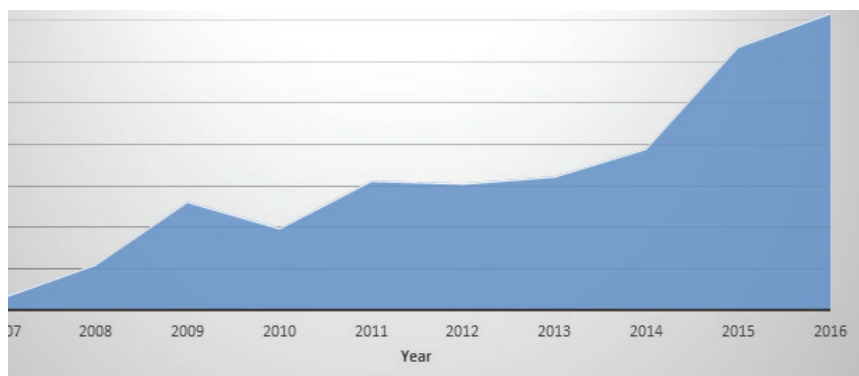
³ www.standardmedia.co.ke/article/2001231837/kenya-to-start-manufacturing-motorcycle-parts

while Honda produces 25,000 bikes a year, all these against the market demand of an average of nearly 125,000 bikes annually. The deficit in meeting local demand is a reflection of potential job opportunities where the capacity to produce locally is scaled up. As Black, Makundi and McLennan (2017) posit, the only way to attract large scale CKD investments to enhance local components is to impose medium tariffs on the cheaply imported Fully Built Units that flood the market.

Regional automotive value chains have not developed significantly in Sub-Saharan Africa. This contrasts with other developing regions such as ASEAN (Association of Southeast Asian Nations), where regional automotive value chains have become increasingly developed (Kobayashi et al., 2015). As such, the pricing varies for the same commodity. The second hand TTW manufactured abroad cost less compared to if they were manufactured locally. A critical growth constraint for expansion of capacity in Kenya is the substandard level of technology per international standards required for manufacturing entities. The required technology benefits the manufacturing sector through three different ways, first vertical integration, second horizontal integration, and third end-to-end engineering (Liao et al., 2017). This creates interconnections between jobs, individuals, innovations and technology.

Despite being the most accessible mode of transport, two wheelers' operations have been marred with safety concerns. As shown in Figure 11, motorcycle associated accidents have been on the upward trend since 2008, with a slight decline in 2010. According to the Road Traffic Injury Prevention Manual by the World Health Organization (2006), the increase in the number of motorcycles in operation on roads must be accompanied by road safety measures to cushion the users. This has not been the case, and where safety regulations apply, such as the National Transport Safety Authority of Kenya (NTSA) regulations.

Figure 11: Motorcycle accidents over the years.



Source: NTSA

The data from NTSA shows the rise of associated accidents since 2008. This coincides with the government exemption of taxes to motorcycles below 250 cc, which lowered the cost thereby increasing the use of motorcycle as means of transport mainly by the unemployed youth in Kenya (Owuor, 2008). The establishment of the NTSA in 2012 to enhance safety has not reduced the fatalities.

To create more, efficient and beneficial jobs, the TTW assembly plant should increase production capacity. In an assembly line, different vehicles are assembled with the use of the same assembly line (mixed model assembly line) (Michalos et al., 2010). A number of obstacles hinder this, such as limited available technology advancement, high cost of production especially energy costs, and high costs of trade diversion due to readily available low priced second hand TTW (Black et al. 2017). Also, regional automotive value chains have not developed to any significant extent in Africa (Black et al., 2017).

Lastly, inadequate driving schools for training of TW is a major challenge. In Kenya, *boda boda* are found in all counties. However, not all counties have specific NTSA accredited driving schools for TTW. Over 80 per cent of riders acquired riding skills informally from their fellow riders (Nasong'o, 2015). They have very little knowledge beyond that necessary to physically operate a motorcycle or three-wheeler. Pettans Driving School has been successful in applying for bursaries from local government development funds to support training for rural motorcycle taxi riders.

6. Conclusions and Policy Recommendations

6.1 Conclusions

The study found that inadequate exploitation of the TTW existing value chains creates an obstacle to employment, which is an impediment to the bulging youth population in need of employment. The value chain analysis points out the need to streamline the sector, since the country presents a rapidly growing market for the wheelers as projected by spontaneous rise since the zero rating of autos below 250cc whose reliability, effectiveness and efficiency is very significant. Currently, the expanding market is characterized by a value chain dependent on supplied imports of wheelers parts for assembling and negligible percentage of fully imported complete wheelers. There is therefore need to promote local manufacturing of the imported parts, production expansion, and revising, fast-tracking and implementing the NTSA policy regulation.

Enhance component manufacture and TTW assembly

The study revealed that TTW components and parts manufacture was at a low scale and largely informal. Only 1 out of 58 parts and components was manufactured in Kenya. The manufacture of components had the exponential potential for youth employment creation. This is because majority of the current youth cohort are more educated and tech savvy compared to previous ones. The study also revealed the high cost of manufacturing the component in the country, low technology and design mechanism existing in the country. The assembly and manufacturing firms were also centralized in urban locations.

Implementation and enforcement of legislation and regulation

Various regulations have been passed including the zero rating of TTW and NTSA regulation on the operations of motorized TTW. However, the rate of TTW accident has remained above 30 cases per month in the last five years (KNBS, 2019) with a peak of about 60 cases per month in 2017 (KNBS, 2019). The number of motorcycle drivers without license, and appropriate driving gear has relatively reduced. Some operators also complained about being harassed by the police. These have been constraints in the sector.

The import and dealership sub-sector is characterized by high initial cost of capital, working capital and expansion capital. This disadvantages individuals aged between 15 and 35 years because of lack or inadequate access to capital. The import process is tedious and contains sidekicks due to foreign exchange fluctuation and presence of counterfeit products.

6.2 Policy Recommendations

In line with the Government objective to improve the enabling environment for youth employment, whether skilled, semi-skilled or unskilled for both formal and informal sector, several approaches are essential to improve job creation on various value chain nodes.

Enhance manufacture of component and Assembly of TTW

The State Department for Industrialization should promote local manufacturing of parts and protect local industries from unfair competition and dumping of goods in Kenya.

Implementation and enforcement of legislation and regulation

The Government through the State Department of Industrialization needs to fast-track finalization and implementation of the Draft National Automotive Policy 2019. Kenya now operates under a two-tier system of governance; the County governments need to put in place relevant by-laws as required, and oversee the execution of the regulations such ensuring all riders operating counties belong to a SACCO to enhance sanity. An integrated transport management system of governing the industry will help create opportunities within the ancillary services such as SACCOs and financial institutions.

The County governments need to formulate relevant by-laws and policies to govern and regulate operations of the wheelers sector in their areas of jurisdiction. Such policies could include designating specific zones of operations for both TTW. The County governments and other partners also need to offer targeted support to the wheelers transport sub-sector in formation of Savings and Credit Cooperatives Organizations (SACCOs), and sponsoring rider trainings and public awareness campaigns. Indeed, the formation of SACCOs in the *matatu* sector brought back sanity to the once ungovernable public transport industry.

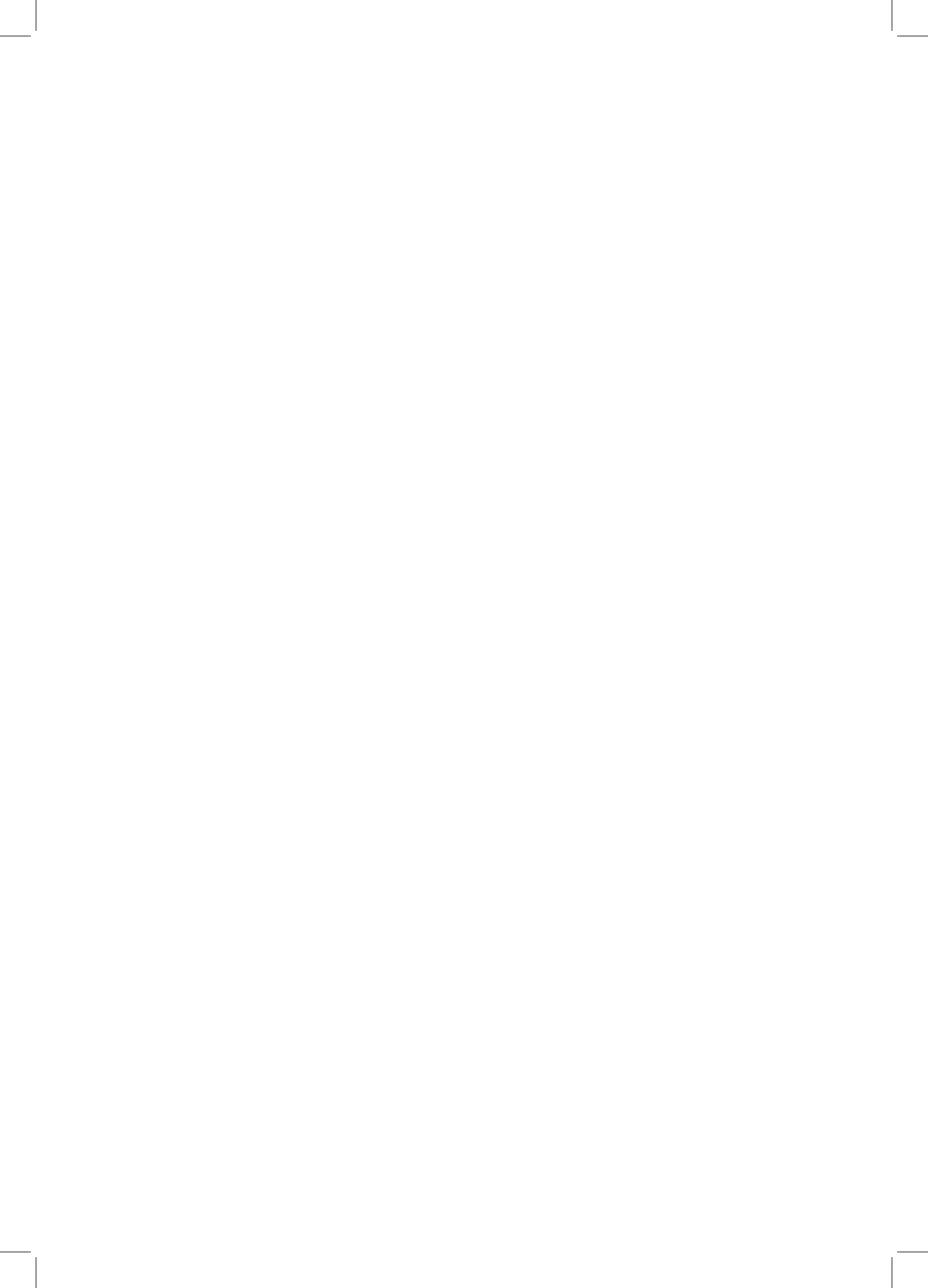
Streamlining the sector to improve youth employability

The import and wholesale nodes, which are mainly operated by dealerships require a high capital outlay which is beyond reach for most of the youth. There is need to consider tax holidays and longer repay grace periods for the youth.

References

- Avner, P. and Lall, S. (2016), Matchmaking in Nairobi: The role of land use. Policy Research Working Papers, December, 33. <https://doi.org/10.1596/1813-9450-7904>.
- Bair, J. (2009), Global commodity chains, genealogy and review. *Frontiers of Commodity Chain Research*, 1-34. <https://doi.org/10.1016/B978-008044910-4.00168-1>
- Bishop, T., Barber, C., Charman, S., Porter, G. and Bradbury, A. (2018), Enhancing understanding on safe motorcycle and three-wheeler use for rural transport. Inception Report. ReCAP Project RAF2114A. Available at: <http://www.Research4cap.Org>, (March).
- Black, A. and McLennan, T. (2016), "The last frontier: Prospects and policies for the automotive industry in Africa". *International Journal of Automotive Technology and Management*, 16(2), 193–220.
- Chege, J., Ngui, D. and Kimuyu, P. (nd), Scoping paper on Kenyan manufacturing. Nairobi: Kenya Institute for Public Policy Research and Analysis.
- Gereffi, G., Humphrey, J. and Sturgeon, T. J. (2001), "Introduction: Globalization, value chain and development". *IDS Bulletin*, 32(3), 1–8.
- Humphrey, J. and Memedovic, O. (2005), "The global automotive industry value chain: What prospects for upgrading by developing countries". *SSRN Electronic Journal*, September. <https://doi.org/10.2139/ssrn.424560>.
- Ignatenko, A., Raei, F. and Mircheva, B. (nd), Global value chains: What are the benefits and why do countries participate?
- Kenya Association of Manufacturers - KAM (2018), Manufacturing in Kenya under the "Big 4" agenda. Nairobi: Kenya Association of Manufacturers.
- Kenya National Bureau of Statistics - KNBS (Various). *Statistical Abstract*. Nairobi: Kenya National Bureau of Statistics.
- Kenya Roads Board (2012), Annual public roads programme. Retrieved from <http://www.krb.go.ke/wdownloads/APRP1213FY.pdf>.
- Krasniqi, B. (2019), Labour market and skills needs analysis. Labour Market Needs Analysis in Kosovo.
- Moraa, G. and Nyachio, M. (2015). No Title. (June).

-
- Mtanga, S. and Mccamel, R. (2019), Motorcycle parts and aftermarket industry regional value chains in South Africa. (April).
- Nguyen, D. T. H. (2019), "Inward foreign direct investment and local wages: The case of Vietnam's wholesale and retail industry". *Journal of Asian Economics*, 65, 101134. <https://doi.org/10.1016/j.asieco.2019.101134>.
- No Title. (2018). 2018, 1–16.
- Nyachio, G. M. (2013). Rjopes Rjopes Creating employment through transport: The Youth And. 2(4), 154-157.
- Ogot, M., Nyang'aya, J. and Muriuki, R. (2018), Characteristics of the in-service vehicle fleet in Kenya. Retrieved from www.changing-transport.org
- Okatch, B. A., Mukulu, E. and Oyugi, L. (2011), "The motivation behind subcontracting relationships between large firms and small and medium enterprises in the motor vehicle manufacturing industry in Kenya". *Australian Journal of Business and Management Research*, 1(3), 25-38.
- Okonda, M. W., Aliata, V. L., Aila, F. O. and Benjamin, O. (2015). EPH. (November 2016).
- Page, J. and August, D. (2019), Addressing Africa's youth unemployment through industries without smokestacks (August), 1–37.
- Paper, W. (2009). www.econstor.eu.
- State Department for Industrialization (2019), Draft National Automotive Policy. Nairobi: State Department for Industrialization.
- Sturgeon, T. J. and Biesebroeck, J. Van. (2011), "Global value chains in the automotive industry: An enhanced role for developing countries?" *International Journal of Technological Learning, Innovation and Development*, 4(1-3): 181–205.
- Sturgeon, T., Van Biesebroeck, J. and Gereffi, G. (2008), "Value chains, networks and clusters: Reframing the global automotive industry". *Journal of Economic Geography*, 8(3), 297-321.
- Summary, O. S. (2007). Annex 3.1: 1.1 Kenyan transport sector details. 1–12.
- World Bank (2016), Republic of Kenya urbanization review, 1–672. Retrieved from <http://documents.worldbank.org/curated/en/639231468043512906/pdf/AUS8099-WP-P148360-PUBLIC-KE-Urbanization-ACS.pdf>.







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