IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE)
e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 15, Issue 4 Ver. III (Jul. - Aug. 2018), PP 47-53
www.iosrjournals.org

Skills and Competency Gaps Analysis of Motor Mechanics in the Informal Sector: A Case Study for Meru Township in Kenya

George Njagi Njeru[1] and Kinuthia Mugi[1]
[1] *School of Engineering, Meru University of Science and Technology, Box 972-60200, Meru Kenya*
Corresponding Author:njagi@must.ac.ke

Abstract: *Motor vehicle mechanics in the informal sector (Jua Kali) have skills and competencies acquired through formal and informal training. However, the skills and levels of competencies of most mechanics can not be ascertained; whether the artisans can continue to competently serve the growing market of increasingly sophisticated imported vehicles and the attendant dynamics in the market. There is also a querry if the entry level skills of the artisan has changed over time while on the field as a result of interaction with customers, and the market environment. It is the desire of the artisans to improve their skills, knowledge and level of competencies so that they can serve their customers better, but the formal education setup does not adequately accomodate trainees from the informal sector thereby limiting avenues for skills and competency development. The purpose of this study was to establish the skills and competencies gaps among motor mechanics in reference to established competency framework, investigate the skills developement dynamics in the informal sectorand develop interventions to bridge the gap. The study employed a descriptive survey, by mapping out a study area, clustering the artisan concentrations and randomly adminstering a structured questionnaire to one in every five artisans in each cluster to establish the competencies and skills gaps thereof. The artisans were also observed as they served their customers. The data collected was analysedusing SPSS and excel tools; mitigation measures were then developed based on competency based training. The findings indicate that the skills gap does not match the rapidly changing technology in the automotive industry, moreover the training facilities in the training institutions do not meet the market requirements. The Competency Bases Education and Training CBET framework may address the gaps so far as it is structured to specifically address unique needs of the informal sector. This paper is intended to inform the formulation and implementation strategies adopted by the authorities to develop requisite skill sets for the automotive sector.*

Keywords:*Skills, Competency gaps, Competency Based Education and Training, Informal Sector, Motor Vehicle Mechanics, Gaps Analysis.*

Date of Submission: 19-07-2018 Date of acceptance: 02-08-2018

I. Introduction

The International Monetary Fund (IMF) estimates that Kenya's GDP per capita will reach US$1 432 (KeS 147,000) in 2015 and to grow at a compounded annual growth rate (CAGR) of 7.5% between 2000 and 2020. This is expected to result in an increase in private consumption and amongst other things, boost the sales of motor vehicles and motor cycles. If the current trend of 10% to 12% growth per annum on vehicle imports is to be maintained, the country will host five million vehicles by the year 2030.The implications of this growth on the physical infrastructure and the skills needed to maintain this fleet is immense. It is thereforeimperative that the employment opportunities arising from this growth are addressed by equipping the youth with relevant skills to take full advantage of them. This research aims to make a contribution to this end by establishing the relevant contribution expanded training can make to improve the skills and competences in the informal automotive sector. Informed youth could act as the catalyst for the desired transformation of the sector so that it plays its rightful role in the national development.

According to the Kenya National Bureau of Statistics(KNBS, 2017)the volume of imported vehicles between 2003 and 2012grew at over 300% from 33 000 units to 110 474 units.In 2015 it was estimated that the vehicle population in Kenya was 1.3 million sourced mainly from Japan and the Middle East (KNBS, 2015). However due to limited disposable income and the high cost of new vehicles, second-hand vehicles dominate the market; at least 8 out of 10 imported vehicles are used vehicles(Thomas Schiller,Karthi Pillay, 2016)

The after sales vehicle market in Kenya isvery fragmented and dominated by independent or informal service providers *(jua- kali).*This marketdepends to a large extent on the availability of cheap repair and maintenance servicesprovided in road side and backstreet informal garages and workshops that dot the landscape and mainly concentrated in the urban areas. On the job training that is not based on any known standards is the norm in the sector and is the main reason for the sector's low productivity and low incomes.

The informal sector is a crucial sector in most developing countries. It has become increasingly important as a source of income and employment brought about by the declining performance of the formal sector(Atieno, 2006). The government has made initiatives for skill development in tertiary institutions for those who do no meet the university entry requirements. These initiatives do not however address the problems of the youth weaned off the formal education system at the primary school level who form a majority of the operatives in the informal sector. Indeed the bulk,57% of the licenced Micro,Small and Medium Enterprises (MSME) are owned and operated by people with at least a primary level certificate, with a starting capital of less that KES 200,000 (KNBS, 2017).

The automotive industry is very dynamic; operatives in the field need to keep abreast with the latest developments in the market, overreliance on tested but outdated technologies can only lead an elimination from the market as the said technologies and associated skills become obsolete. Consequently it is imperative that the existing skill pool is kept upto date and hence the need to train and equip with the necessary competencies. The Competency Based Education and Training (CBET) method provides a flexible, effectiveand work friendly on the job in training that can easily bridge the gaps. The acquired competencies can then be certified and enable graduates to expand their outlook or join the formal employment system where papers are essential.

Further the skills gap problem is compounded by rapid development in the electronics and information technology sectors have had a very profound impact on the global automotive industry. As consumersare very dynamic with regard to vehicle models; operatives in the field need to keep abreast with the latest developments in the market or risk being irrelevant.

The purpose of this study was to establish the skills and competencies gaps in the informal automotive sector within the urban area of Meru Town with reference to established competency frameworks and investigate the skills developement dynamics with a veiw to injecting interventions to bridge the identified gaps.

II. Literature review

2.1 Informal sector in Kenya

The evolution and historical state of affairs responsible for the emergence of the informal sector in Kenya can be traced back to the early 1960s when the government of the new independent state introduced trade licenses, work permits for foreigners, state-owned organizations (parastatals) as well as consent for civil servants to own and operate businesses all as part of a broader plan for the indigenization programme.

By 1992 the government approach to the informal sector had been refined and was published as Sessional Paper No 2 of 1992 on *Small Enterprise and Jua Kali Development in Kenya;* this Paper has served as the foundation of all other programmes for the development of the sector. A number of donor agencies including the United Nations Development Programme (UNDP), British Department for International Development (DFID),United States Agency for International Development (USAID), German Technical Development Agency (GTZ) and the European Union (EU), during this period designed a series of support programmes to promote the growth and development of micro and small enterprises in Kenya.

Kenya's informal sector covers all semi-organized and unlicensed small scale activities largely undertaken by self employed persons. The bulk of the activities are carried out by artisans who use simple technology.(Ronge E, Ndirangu L., Nyangito H, 2002)Classified the informal sector into two genres; the small informal productive sector consisting of enterprises that are considered important for poverty alleviation and that are important producers of goods, services and employment. He observed that incomes from these enterprises can be significantly higher than those of the lower ranks of the formal sector.The second genre is involved in survivalist activities which characterize the *Jua kali* garages and workshops dotted around the Kenyan landscape. These are engaged mainly in commerce but are generally involved in basic and low quality forms of production with the intention of earning income to meet subsistence needs.

2.2 Skills Gap in Informal Sector

It is evident that there is a skills gap between what the market requires and the skills competencies of the artisans in the informal sector(Arvil V. Adams, Sara Johansson de Silva, and Setareh Razmara, 2013). In 2008 the Government of Kenya had started addressing this skills gap through the Technical and Vocational Vouchers Program (TVVP) launched in 2008 in Nairobi, Mombasa and Western Kenya (Busia, Bungoma, Siaya, Kisumu and, Kakamega Districts). A total of 2,163 Western Kenyan youth from Busia district who were previously part of the Kenyan Life Panel Survey participated in the project. However, the analysis is documented in three reports (Hicks, Kremer, Mbiti and Miguel, 2011), concluded that:

a) High costs in TVET is an access barrier to training,
b) The training skills providers are few, not diverse to the interest of the learners and far away from their dwellings to take advantage of affordable accommodations,
c) Information on training supply and labour market contexts is low. The end benefits of the training programmes were not enough to enable a trainee make informed decisions.

The findings suggested that vocational training can serve as an effective second chance program for those youth with a low educational attainment. Program participants with lower education, in particularly those without secondary schooling but have completed primary education, were less likely to drop out of the training than those with secondary schooling(Hicks, Kremer, Mbiti and Miguel, 2011)

In view of the very large numbers of youth (160,000 in 2005 and growing to 290,000 in 2017) dropping out of the education system after KCSE a much more inclusive training system must be sought than is currently the case with the TVET programmes. Out of the 1,300 TVET institutions 70% of which are public with a capacity of 202,000 (KNBS, 2017) the numbers of youth being weaned out of the education system are staggering. They are as much stakeholders in the wellbeing of the nation as other Kenyans hence the need therefore to seek ways to include them within the TVET framework.

Details of education qualifications of business owners/operators are shown in Figure 1, about one third of business owners/operators in licensed Micro, Small and Medium Establishments (MSMEs) had attained secondary school education, while 23.3% of business owners had attained CPE/KCPE certificate. Further, 9.8% of business owners or operators were university degree holders. Most of these graduates were working in human health and social work activities; electricity, gas, steam and air conditioning supply; professional, scientific and technical activities; and in education sectors. In unlicensed MSMEs, 39.7% the business owners/operators had attained primary education while 31.4% had no education (KNBS, 2017). It is important that this education gap which has a bearing on skills development be narrowed to enhance economic production and also contribute towards creating employment opportunities in the informal sector.

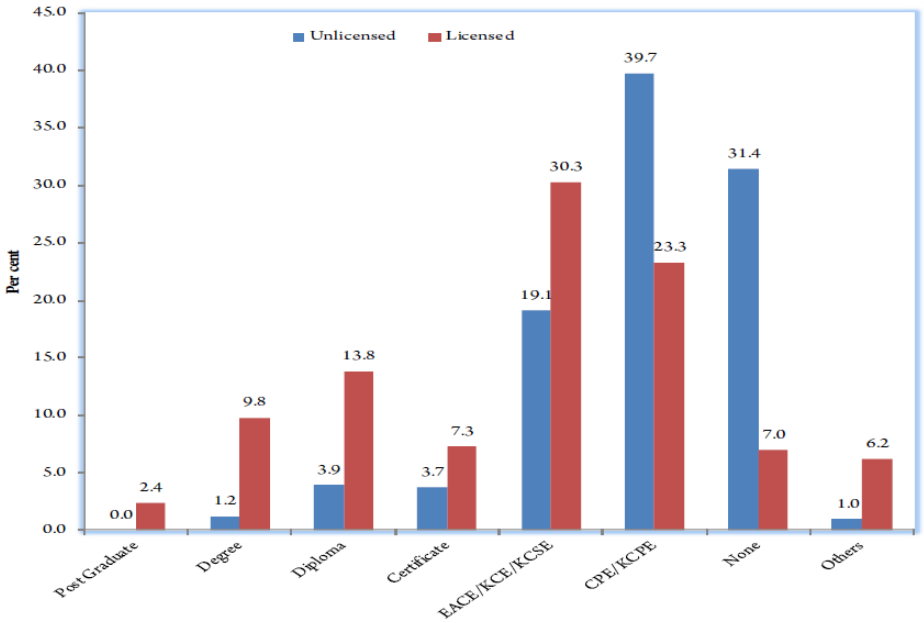

Figure 1: The distribution of Education levels of Business owners/ operators in 2016(KNBS, 2017)

2.3 Competency Based Education and Training

The shift from knowledge-based education and training (KBET) to a Competency Based Education and Training CBET system in Kenya is largely been influenced by the Kenya Vision 2030 which aims to equip the nation with high level manpower at all levels sufficiently equipped with requisite knowledge, skills and attitudes to meet the challenges of development at local and international levels.

The (CBET) curriculum development process involves the establishment of the job/industry needs, the development of a competency framework, curriculum formulation and development which culminates in the rolling out and delivery.

Competency Based Education and Training aims at the systematic development and delivery of training guided by five essential elements:

i. The tasks to be taught occupational standards, are identified by experts in the occupation (includes those from industry as well as those engaged in teaching),
ii. The program allows each learner to have the opportunity to develop and be evaluated on the basis of the competence achieved on specific tasks, it also recognizes prior learning.
iii. The trainees are aware of the required unit competencies that are used for assessment and the assessment is based on demonstration of skills rather than mere knowledge.

iv. The students progress through the programme by demonstrating the attainment of the specified competencies in a modular and self paced manner.
v. The training is trainee centered and the learning time flexible.

The CBET philosophy is one of the innovations that have been adopted by TVET (Technical Vocational Education and Training) in the last century. According to (Kouwenhoven, 2003), TVET has its roots in Moscow in the 1860s when Victor Della Vos developed methods for task analysis; it then became popular in the United States in the 1970s in the performance based vocational teacher educational movement. In the 1990s TVET was adopted in England and Wales in their National Vocational Qualifications system (NVQs). Because of its promising results it has spread to other parts of the world including Kenya.

Apart from being used to improve the students (or workers) current level of job performance, CBET can also be used to prepare them for changing job requirements or introduce new tools or technology in the place of work. This is particularly pertinent in the automotive industry where new technologies are increasingly being applied to improve engine efficiency, passenger comfort and safety.

Following a curriculum review carried out between 2008 and 2009 a 'competency based' curriculum was introduced for craft and diploma programmes in TVET institutions in Kenya; a modular approach was embraced with the craft and diploma programmes divided into two and three modules respectively to replace the terminal examination that existed before (Nyerere, 2009). Much emphasis has been placed on practical competencies relevant to modern industry that are assessed at the end of each module; the final craft or diploma certificate is issued after successfully passing all the modules. The module system allows for multiple exit and entry as opposed to the old programme that had only a terminal examination.

There is need therefore for adequate funding in order to expose large numbers of young people to vocational training and to a culture of scientific investigation and application. Kenya's Vision 2030 indeed recognizes the need for this approach through the application of Science Technology and Innovation (STI) as the main vehicle for creation of wealth(Republic of Kenya, 2013). Kenya can reorient itself towards sustainable development using TVET as a vehicle for socio-economic and technological transformation. Through it the challenges of increased youth unemployment, food insecurity and environmental degradation can be sufficiently addressed.

III. Research Materials and Methodology

3.1 Research Design

A descriptive research survey was adopted in this study. This included semi structured-interviews, questionnaire, observation and desk survey. Information was also obtained on existing phenomena by asking respondents about their perceptions, attitudes, behaviours or values (Mugenda O and Mugenda, 2003).

To ensure the validity of the instruments and relevance to the objective of study (questions and questionnaire), the researchers discussed the tool with colleagues in the School of Engineering at Meru University of Science and Technology. The tools were designed to accomodate emerging trends whch were based on personal views of the respondents at different workshops.

Oral interviews guided by the an earlier prepared questionaiire was used as the primary tool of collecting data. The questionnaire was designed for the purpose and used for all the respondents to solicit responses. The interviews were aimed at establishing the skills gaps in the informal sector by comparing what is required to perform given tasks and the skills available in the field to execute the said task. During interviews the researchers also observed the artisans as they carried out the their assignments with the intention of establishing compliance to the proper working ethics, environment, tools used, dress code, customer relations and safety measures that need to be observed. These observations elicited further clarifications from the artisans especially where they were not in compliance to standard operating procedures for the tasks in review. The observations also formed the basis of establishing behavioural gaps in relation to the established code of conduct of automotive mechanics.

3.2 Respondents of the Study

Oral interviews were conducted with the owners of the garages/workshops or artisans working under them when they were not present. It was noted in some cases that the registered owner was not necesarily the one in charge or the premises. It was noted that some garages were an amalgamation of several vehicle systems specialist who had come together for convenience. The categories of the artisans interviewedincluded auto electricians, panel beaters, welders, upholsters, spray painters, general fitters andvehicle computerdiagnostics experts. Some specialist especially auto electricians did not have fixed abodes and operated in several garages within the vicinity thereby presenting a challenge in assigning them a locationduring data collection.Overall we foundthe views of the respondents to be representative of the informal sector in consideration for this study.

Figure 2: Workshop locations in Meru Town (Kenya) (https://www.google.com/maps)

3.3 Sample Design

Data from the Meru County business registration office indicated that 88 businesses were licenced to carry out business under the activity description; small workshop/service repair contractor. The activity description includesmotor vehicle body building and repair, engine repair and tuning, transmission components repair, panel beating, vehicle upholstery and fittings, auto electrics and engine diagnostics, diesel mechanicsas well as welding and fabrication. These statistics were also backed by data 57 licenced workshops(Municipal Council of Meru , 2011). Asummary of the business locations is as shown in Figure 3 below and and in the mapFigure2. It wasnoted that only 61 out of the 88 workshops represened automotive related garages.

Table 1: Sampled Workshops

	Location	**Sampled Workshops**
1.	Stadium	1
2.	Kaaga	2
3.	Gakoromone	6
4.	Milimani	1
5.	Mwenda antu	2
6.	Commercial	3
	Total	**15**

The Krejcie and Morgan formula for small populationswas used to determine to determine the sample size S;

$$s = \frac{x^2 NP(1-P)}{d^2(N-1) + x^2 P(1-P)}$$

Where:
s = sample size
x = 3.84 (the table value for chi-square for 1 degree of freedom at the desired confidence level; 95%),
N = the population size,
P = the population proportion (assumed to be 0.50 to provide maximum sample size) and
d = 0.05 (the margin of error) (Krejcie & Morgan, 1970).
From the location clustersin Figure 3 , area sampling was done and a sample of 15 (24.6%) garages were subjected to interviewsfor the study as shown in Table 1.

3.4 Results and Discussion

It was observed that the results were varied at different workshops. These were coded and graded accordingly to expose the specific views of the respondents which were thereafter expressed in percentages.
The level of education of the respondents differed slightly with the profile presented by the KNBSecomnomic survey in 2016. 65% of the respondents had at least a KCSE certificate. This was attributed to the respondents background that values education. The area choosen for the studyis also relatively wellendowed with agricultural resources that are used to support education.

Majority of those with KCSE qualification had also attended post secondary school training includingvehicle diagnostis making them conversant with the technologies in use bythe new generation of vehicle imports.

All respondents were receptive to the idea of further training and prefered short courses as they could not be away from their work areas. This was attributed to the survivalist nature of the informal sector.

On the attributes of competencies expected from an automotive mechanic, the results were analysed as shown in Figure 4: Competency attributes of the Mechanics below.

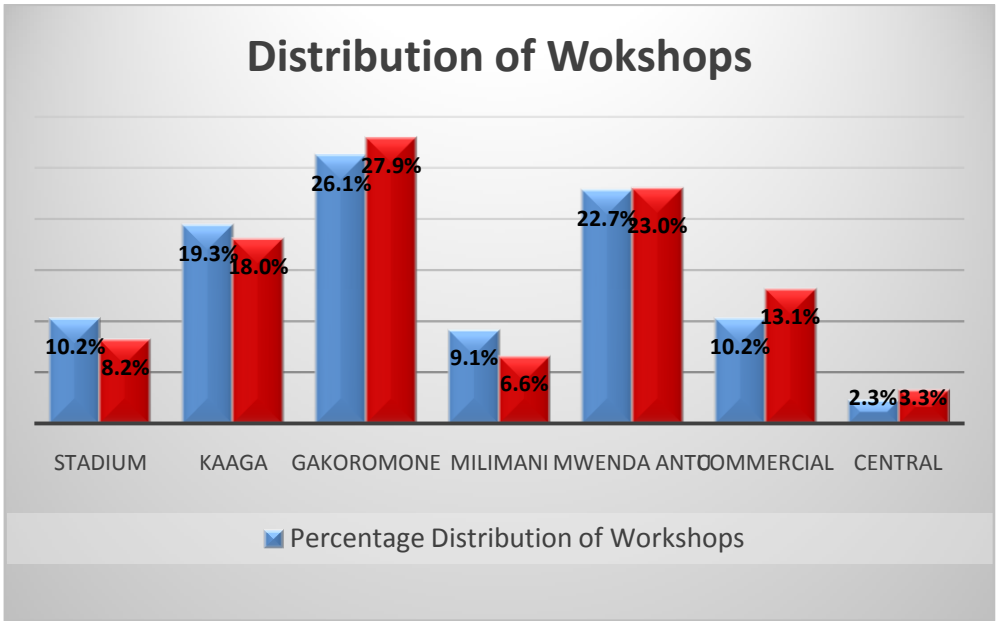

Figure 3: Distribution of workshops

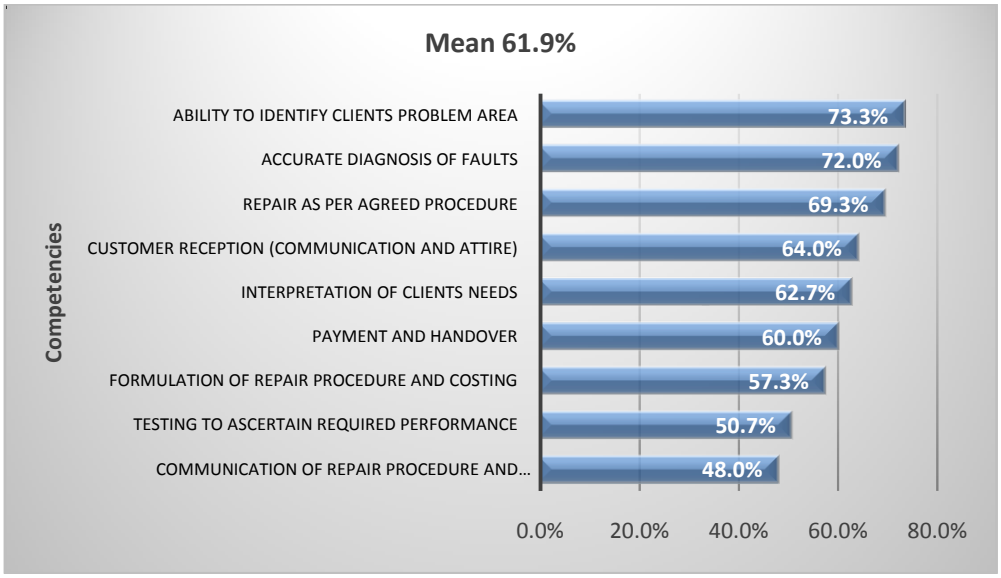

Figure 4: Competency attributes of the Mechanics

The attributes recorded in the figure above are considered the basic competencies that a mechanic should posses. It was noted that the mechanics were able to identify and diagnose client problems accurately and repair as per the agreed procedures at 73.3%, 72% and 69.3% respectively.The competency attribute that was poorly handled was communication of repair protocol and scheduling of repairs at 48% and carrying out tests to ascertain performance after repair at 50.7%. This was attributed to lack of testing equipment, knowlege of testing as a requirement or ignorance.

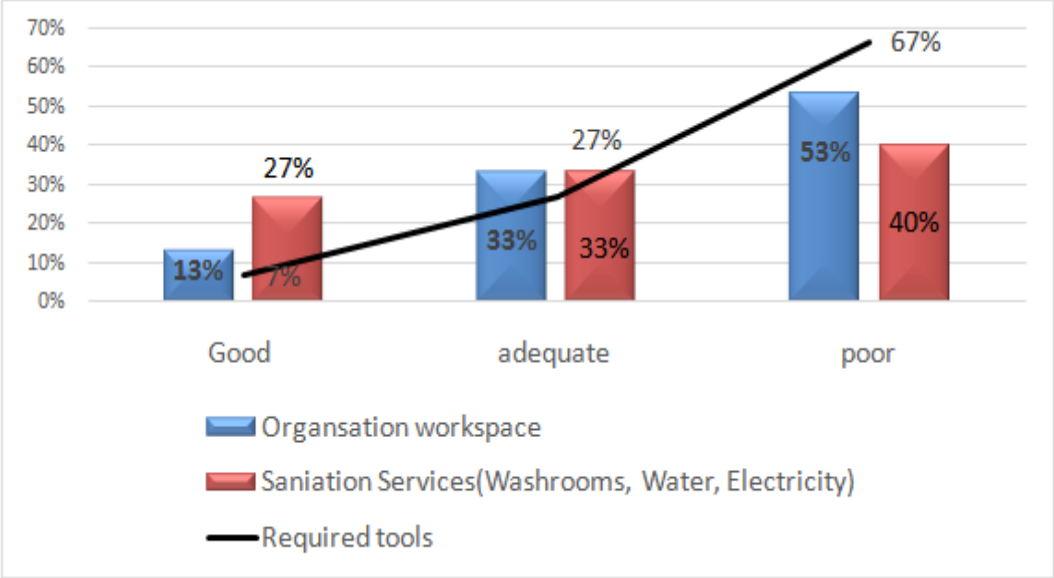

Figure 5: Work Environment observations

3.5 Discussion of results

From the results it is attributable that the competencies levels are at a mean of 61.9% indicating that the mechanics are short of the acceptable competencyrequired by the market needs. There is a need for atraining intervention by both the private sector players and the government in order to prepare the mechanics to offer quality service and meet the expectationsof the expanding market.

The study noted that the statutory and safety requirementswere not complied with in most of the workshops. Some of these include working attire, usage of tools and lack of safety equipments.

It is also important to note that the work environment and workspace organisation was poor asobserved in 53% in both cases.Poorsanitation facilities was noted at a level of 40% while 67% of the garages did not have the requisite tools at as shown in Figure 5. These elements will obviously contribute to a compromised work output and quality.

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G. Njeru, K. Mugi "Skills and Competency Gaps Analysis of Motor Mechanics in the Informal Sector: A Case Study for Mere Township in Kenya." IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) , vol. 15, no. 4, 2018, pp. 47-53.