International Journal of Academic Research in Business and Social Sciences
May 2016, Vol. 6, No. 5
ISSN: 2222-6990

The Role of Observability in Modern Automobile Technology among Mechanics Operating in Micro and Small Enterprises in Kenya

Kennedy Ojucku Mairura
College of Human Resource Development, Nairobi: Kenya

Dr. Patrick Karanja Ngugi & Prof. Christopher Kanali
Jomo Kenyatta University of Agriculture and Technology, Nairobi: Kenya

DOI: 10.6007/IJARBSS/v6-i5/2167 URL: http://dx.doi.org/10.6007/IJARBSS/v6-i5/2167

ABSTRACT
Micro and Small Enterprises in Kenya have restricted levels of technology, inappropriate technology and inadequate institutional capacity to support adaptation and absorption of modern technological skills. Technological inventions, innovations and developments in electronics, hydraulics and pneumatics have revolutionalized the automobile industry. In light of the these developments, the informal sector mechanics must be equipped with appropriate technical skills in order to have a competitive edge as far as servicing or repairing modern vehicles is concerned. This study aimed to determine factors that influence technology adoption among automobile mechanics in micro and small enterprises in Nakuru town; Kenya. The specific objective of the study was to establish the role of observability in the adoption of technology. The research used a descriptive cross sectional survey design and employed both probability and non-probability sampling techniques to collect quantitative and qualitative data. After a detailed binary logistic regression analysis using SPSS, the study found that, adoption of various modern motor vehicle technologies is influenced by; among other factors, perceived attitude of the mechanics in terms of observability of a particular innovation. The study recommended that the government should emphasize and invest in intellectual capital by way of developing relevant training curriculum for the mechanics based on industry and environmental needs. This study is significant as its findings, if implemented; can jump-start the informal mechanics towards achieving quality, competitiveness and both human and environmental safety.

Key words*: Observability, Micro and Small Enterprises, Technology adoption*

INTRODUCTION

1.1 Background Information

The development of the informal sector has long been regarded as crucial for economic development in both developed and developing nations as it plays an important role in job creation, poverty alleviation and in the utilization of local resources. A study conducted by

Bureau and Fendt (2013), indicated that; micro and small enterprises (MSEs) represent 99% of an estimated 19.3 million enterprises in the European Union (EU), and; provide around 65 million jobs, representing two-thirds of all employment. In Latin-America, the vast majority (approximately 80-90%) of companies are micro enterprises. While in Brazil the economy expanded by only 2% in 2011, MSEs grew by 8.5%. In Colombia, MSEs accounted for 39% of all jobs and 67% of industrial jobs. Moreover, MSE membership in Colombia's chambers of commerce rose from an average of 22% in 2009 to 93% in 2012. In Japan, 81% of all employment is in MSEs where the average enterprise employs nine staff as opposed to four in the EU. In the Organization for Economic Cooperation and Development (OECD) countries, MSEs represent over 96% of enterprises in most countries and generate over half of private sector employment (Bureau & Fendt, 2013).

According to Kenya National Alliance of Street Vendors and Informal Traders (KENASVIT, 2011) the Micro and Small Enterprises (MSE) sector is the source of income for over 8 million people, who represent the majority of working Kenyans. In Kenya, sector is dominated by Micro Small and Medium-sized enterprises (MMSEs) involved in various activities such as woodwork, metal work, leatherwork, textile, handicraft, service industry, retail trade and motor vehicle repair among others. These enterprises in Kenya represent a vital part of the economy, being the source of various economic contributions through; the generation of income via exporting, providing new job opportunities, introducing innovations, stimulating competition, and engine for employment. In spite of their importance, this sector faces many challenges, such as lack of access to credit, poor infrastructure, use of inappropriate technology and lack of intellectual capital among others. Intellectual capital appears as the most important and vital component of a knowledge-based economy (Karanja, Gakure, Were, Ngugi & Kibiru 2012).

However, in the present economy, small and medium enterprises are facing tremendous challenges and threats to survive in a competitive environment. As a matter of fact, SMEs are faced with the threat of failure with past statistics indicating that three out five fail within the first few months (Bowen, Morara & Mureithi, 2013).The impact of intellectual capital on the general performance of the Small and medium enterprises has become a very important issue now than ever, this is due to the level of globalization of whose outcomes are privatization and deregulation of markets, aggressive competition and the ever-rising expectations of customers. These dynamic changes are very much pronounced in the automobile industry where liberalization and globalization has resulted into an influx of various makes and models of motor vehicles all competing for the same market. In addition, these modern vehicles incorporate complex electronic components that require only skilled and knowledgeable mechanics to diagnose service and or repair (KEMRA, 2014). As a result of this, there is need for businesses to be at their best in order to be relevant in the environment. There is no known comprehensive study which has been conducted in Kenya to establish factors that determine automobile technology adoption among mechanics operating in the micro and small enterprises.

1.2 The Automobile Repair Sub-sector

In Kenya, repairs to motor vehicles are undertaken in either of two places: dealer (formal) garages and *Jua Kali* (informal) garages. Mechanics in the informal sector perform the bulk of the repairs yet most of them do not have the right equipment and many have had no formal education in repairs of motor vehicles. With changes in motor vehicle technology, the mechanics have not kept up with the changes and this has had a negative impact on the quality of the repairs they undertake on motor vehicles. This calls for development of new policies and incentives for the informal sector that can take care of and respond to technological changes. Majority of the Jua Kali garages are found in urban centers (Wanyeki, 2014). This is because in urban centers is where most motorists are found and also where supporting businesses (spare part shops, petrol stations, etc.) are found. Those garages located in the outskirts of town are to be found in the densely populated estates and this is because the high rate of unemployment in such estates forces many people to start Jua Kali businesses including garages. A majority of the Jua Kali garages are located in temporary workshops. This could be attributed to the ownership of the plots within town in that most Jua Kali garages rent the places they are using and therefore cannot make permanent improvements on the plots (Wanyeki, 2014).

According to Kenya Motor vehicle repair association (KEMRA) (2014), most garage owners/managers have had some form of formal education. This is because the nature of activities in garages requires some technical understanding and so it is imperative that the owners/managers have some basic education. In contrast, the majority do not have professional qualifications. This seems to be because those with formal training normally secure jobs in the formal sector and it is only after retirement from the formal sector that some venture into the Jua Kali sector. Also there is perception by some of the owners/managers (and even some members of the public) that the curricula in technical training institutions are outdated, and hence not relevant to the job market. Most garages handle less than five cars a day. This is due to their capacity in manpower and space. Plot owners don't restrict the numbers or kinds of tenants in their plots so long as one can find space and is ready to pay rent. This makes most garages to be congested and restricts the number of cars at any given time and also the number of mechanics. Majority of the Jua Kali garages perform both minor services and major services. This is because the services involve routine maintenance and schedule services which in most cases are done upon the requests of customers. There is nothing much that requires specialized personnel and equipment and anybody with basic automotive knowledge can do. It involves visual checks, adjustments and component replacement (i.e. changing oil, fuel and oil filter, spark plugs, brake pads and shoes). Mechanics in the informal sector perform the bulk of the repairs yet most of them do not have the right equipment and many have had no formal education in repairs of motor vehicles. In the automotive industry, the repair of motor vehicles is one activity that the Jua Kali sector has come up as an alternative to the formal (dealer) sector.

Technological inventions, innovations and developments in electronics, hydraulics and pneumatics have revolutionalized the automobile industry. In light of the these developments, the informal sector mechanics must be equipped with appropriate technical skills in order to have a competitive edge as far as servicing or repairing modern vehicles is concerned (WB,

2013). Low costs of training (apprenticeship) in this sector attract potential mechanics. However the quality of services offered in this sector is much lower than those offered in more formal settings (Kipkurui, Kithyo, Okemwa & Korir, 2004). This may be attributed to lack of proper tools and equipment and also lack of capacity to adopt modern technology. In spite of these developments, there is no known study that has been undertaken to provide some insight as to the slow pace of technology adoption among the informal mechanics. Yet, the mechanics have not kept up with the changes and this has had a negative impact on the quality of the repairs they undertake on motor vehicles.

1.3 The Problem

A summary report of the US National Highway Traffic Safety Administration (2013) task force that studied consumer losses in auto repair and maintenance found that consumers lose about $20 billion annually due to improper or unnecessary repair and maintenance practices. The losses consist of wasted repair expenditures, wasted fuel, avoidable accidents and pollution, and reduced car life occasioned by improper diagnosis and repair of modern automobiles. Another study conducted by Morgan (2013) during the month of November 2013 on world traffic deaths by region revealed the following number of deaths due to motor vehicle accidents: South-East Asia 335,000, Western Pacific 334,000, Africa 194,000, Middle East 123,000 South America 94,000, Europe 92,000 and North America 52,000. Most of these accidents were caused by driver error or mechanical failure. Mechanical failure are, in turn, caused by lack of repair knowledge, failure in understanding or using vehicle manufacturer's manuals and a slow rate of modern vehicle technology adoption. According to Kenya Motor Repairs Association (2014), most mechanics in Kenya have not acquainted themselves to modern vehicle technology and thus costing motorists unnecessary expenses and at times total failure of major vehicle systems or components. Adoption of modern automobile technology will ensure accurate and reliable diagnoses, repair and or service of vehicles, thus lowering maintenance costs as in fuel consumption and less frequent repairs, maximum safety and a cleaner environment. It is critical for the informal mechanics to adopt modern auto technology in order to alleviate the possible challenges. The motor vehicle repair and service industry is thriving and it is not uncommon to find a six-acre yard (e.g., Kigandaini in Thika town) with several small open-air garages in towns across Kenya (Kinyanjui, 2011). With increasing technical sophistication, the human resource in this requires continuous development of technical and interpersonal skills necessary for them to remain relevant in their practice or otherwise "perish" Barber (2013).

1.4 Purpose of the Study

The general purpose of this study was to assess the determinants of technology adoption among automobile mechanics in micro and small enterprises in Kenya. Specifically, this study sought to establish the role of Observability in the adoption of technology within the informal automobile mechanics in Kenya. This study is important in a number of ways: first, the study ventures into a field critical to the development of human resources. In particular, this study

focused on the development of informal automobile mechanics operating MSEs, whose role has been underestimated both at the local and national level, resulting in little effort being directed at developing and exploiting the inherent potential. Further, the globalized economy is seriously campaigning for greener energy solutions. Therefore, minimization of harmful carbon emissions exhausted from the increasing number of automobiles is crucial. This can be achieved only if the mechanics adopt technologies that can enable them to; effectively and efficiently service and repair vehicles as per the manufacturers' standards. This will also lead to fuel efficiency in a country like Kenya where fuel prices are considerably very high. Also identifying the technological challenges facing informal mechanics may be meaningful in terms of the types of intervention (finance, training, management, and technology) donors from the developed countries may provide. Secondly, much data regarding MSEs is still needed and thus this study generated information on the status of mechanics operating in Nakuru town and Kenya as a whole. The goal here is a move towards liberating mechanics from their socio-cultural, psychological and economic handicaps through developing approaches that enhance adoption of modern technology. Finally, the study is justified on the grounds that the information availed will assist the Kenya government and other stakeholders in policy formulation and in the development of appropriate approaches for future interventions, so as to effectively cater for entrepreneurs in MSE sector. It is hoped that this study adds to the available body of knowledge and increase the understanding of how to best empower mechanics in the informal sector, so that they in turn can contribute more meaningfully to economic development.

1.5 Hypotheses

H_0: Observability does not play any role in the adoption of technology within the informal automobile mechanics in Nakuru town.

LITERATURE REVIEW

2.1 Theories of Technology Diffusion and Adoption

The decision of informal automobile mechanics to adopt modern technology is a complex process with a wide number of influencing factors. A key issue in trying to determine future adoption of a technology is to understand why an individual would adopt one technology while resisting another. According to Straub (2009), "technology adoption is (a) a complex, inherently social, developmental process; (b) individuals construct unique (but malleable) perceptions of technology that influence the adoption process; and (c) successfully facilitating a technology adoption needs to address cognitive, emotional, and contextual concerns". A number of models and theories have arisen which aim to uncover the factors that will influence the adoption of technology. These factors range from focus on the technology itself through to the psychological characteristics of the individual (Dillon & Morris, 1996). Due to the wide ranging issues of why an individual would accept or reject a technology, it is unlikely that a single-variable explanation could account for this decision. Theories have been developed to help

understand adoption and have been used to explain adoption in the educational context. Technology Acceptance Model, developed by Davis (1989), is one of the most influential research models in studies of the determinants of technology acceptance to predict intention to use and acceptance of technology by individuals. Technology Acceptance Model has received considerable attention of researchers in the information system field over the past decade. In the Technology Acceptance Model, there are two determinants including perceived ease of use and perceived usefulness. Perceived usefulness is the degree to which an individual believes that using a particular technology would enhance his or her job or life performance. Perceived ease of use is the degree to which a person believes that using a particular technology would be free of effort. Perceived ease of use and perceived usefulness positively affect the attitudes toward an innovation; and further, positively affect the individuals' intentions to use and the acceptance of a technology. In addition, perceived ease of use positively affects the perceived usefulness, and both of perceived ease of use and perceived usefulness are influenced by external variable. Up to date, many researchers added new variables based on the Technology Acceptance Model. Agarwal and Prasad (1998a, 1998b) added the construct of compatibility in the Technology Acceptance Model. Dishaw and Strong (1999) integrated Technology Acceptance Model with Task-technology Fit. Agarwal and Karahanna (2000) added cognitive absorption, playfulness and self-efficacy based on Technology Acceptance Model. Venkatesh and Davis (2000) added subjective norms with Technology Acceptance Model. Chau and Hu (2002) integrated peer Influence with Technology Acceptance Model. Chiu et al. (2005) added personal innovativeness with Technology Acceptance Model. Gefen et al. (2003) and Wu and Chen (2005) added the construct named trust with Technology Acceptance Model. Walczuch et al. (2007) and Lin et al. (2007) integrated technology readiness with Technology Acceptance Model. Chen et al. (2009) synthesized the essence of technology readiness, Technology Acceptance Model, and Theory of Planned Behavior to propose an integrated model for understanding customers' continued use of self-service technologies. Lee (2009) united the Technology Acceptance Model with Theory of Planned Behavior, perceived risk and perceived benefit to understand the adoption of internet banking. Chen and Chen (2009) re-examined the Technology Acceptance Model to understand the automotive telematics users' usage intention. Stern et al. (2008) proposed a revised Technology Acceptance Model to investigate the consumers' acceptance of online auctions. Serenko et al. (2007) modified Technology Acceptance Model to assess user acceptance of interface agents in daily work applications. Chen et al. (2009) proposed an integrated model including Technology Acceptance Model, Theory of Planned Behavior, and Technology Readiness to explain the users' adoption of self-service technologies.

2.2 The Role of Observability

Observability is where by an innovation use and effects must be visible by others. According to the Society of Automobile Engineers (SAE), all vehicles manufactured after the year 1996 must be OBD II compliant (Innova, 2012). And with the government of Kenya policy that all vehicles imported into the country must be less than 8 years old since manufacture, it then means that most petrol or gasoline operated vehicles in the country incorporate EFI systems. In the case of

gear shifting mechanisms, 85% of automobiles manufactured globally use automatic or semi-automatic transmission systems; commonly known in Kenya as "automatic gearbox" (Growse, 2012). For this reason, a large number of automobiles in Kenya, including heavy commercial vehicles use automatic transmission systems. In this regard, the informal auto mechanics have no choice but to adopt these technologies if they are to remain in business. Overall for a technology to be adopted into the Jua Kali context, it needs to show relative advantage, compatibility and lack of complexity. In addition users, especially mechanics need to see a technology in action and be given a chance to try out this technology themselves. The innovation or invention itself is important to consider, however, as shown in the last two characteristics, the perception of the user is also important.

The dynamic changes in of modern automobile technology are visible and their effects on users are also visible. A study by Wanyoike (2013); "Determinants of Information and Communication Technology adoption by small enterprises in urban Kenya" used a logistic regression model to establish if there is any relationship between the Rogers (1995) technology adoption attributes and ICT adoption in Kenya. Findings were that: relative advantage, compatibility, and complexity and observability influence adoption of ICT among small enterprises. Advantages cited included: improved business efficiency and operational effectiveness, increase in speed and reliability of transactions among others. Previous studies by Saxena and Kehar (2011) found that Observability of a new technology is positively related to adoption. According to the society of automobile engineers (SAE), all vehicles manufactured after 1996 must be on-board diagnostic compliant. This means they incorporate a central processing unit (CPU), are electronically fuel injected and electronically ignited. In addition 85% of all vehicles being manufactured today use automatic transmission systems. These are the major components of modern automobiles (Innova, 2012). Observability attribute is related to risks. Adopters will not adopt an innovation if its benefits are hard to observe. These characteristic increases uncertainty level on the value of the innovation and therefore increase the risk of its adoption.

METHODOLOGY

3.1 Research Design

This study was a descriptive research specifically deploying cross-sectional survey to gather information from informal automobile mechanics in Nakuru town in order to establish and assess the role of: relative advantage, compatibility, complexity and observability; in the adoption of modern auto technology. This type of design utilizes different groups of people who differ in the variable of interest, but share other characteristics such as socio-economic status, educational background among others (Saunders et al., 2003). This methodology is suitable for this study because informal mechanics tend to specialize in different areas like: auto-body, auto electrics, petrol and diesel powered engines though they have common socio-economic characteristics. The defining advantages of this design are that, it takes place at a single point in time, it does not involve manipulating variables, it allows researchers to look at

numerous variables at once (training, income, experience) and is often used to look at the prevalence of phenomenon in a given population (Gratton, 2004). Since there is no manipulation of any variable, this design is reliable and if carried out in similar environments, it will yield similar results. This design estimates prevalence of an outcome of interest because the sample is usually taken from the whole population. Since cross-sectional designs generally use survey techniques to gather data, they are relatively inexpensive and take up little time to conduct (Borg & Gall, 1993).

RESULTS AND DISCUSSION

4.1 Adoption of Automobile Technology Innovation as affected by Observability

According to Jolly (2011), observability is defined as the result of an innovation being available for others to see. He further adds that, this attribute is related to risk. Adopters will not adopt an innovation if its benefits are hard to observe. These characteristic increase uncertainty level on the value of the innovation and therefore increase the risk of its adoption. Although the performance of an innovation to meet the technical features and price requirements can influence this factor, at the end, it is the perception of the adopters which is the determining factor. Observability in this study included the availability of modern vehicle diagnostic tools and equipment in as many garages as possible for other mechanics to see and emulate. Selected tools and equipment necessary to repair modern automobiles as recommended by vehicle manufacturers were included in the observation check list displayed in Table 4.1.

Table 4.1: Observation check list

S. No	Requirement	User mechanics	Available	Not available	Total
1	EFI auto data	Electric, Petrol, Diesel, General	13	65	78
2	EFI scanner	Electric, Petrol, Diesel, General	2	76	78
3	EFI code reader	Electric, Petrol, Diesel, General	11	67	78
4	Fuel pump gauge	Petrol, Diesel, General	3	68	71
5	Oil pressure gauge	Petrol, Diesel, General	6	65	71
6	Cooling system analyzer	Petrol, Diesel, General	5	66	71
7	Engine analyzer	Petrol, Diesel, General	0	71	71
8	Repair manual	Petrol, Diesel, General	8	63	71
9	Diode-transistor tester	Electric, General	5	40	45
10	Digital multi-meter	Electric, General	31	14	45
11	Wiring schematic diagrams	Electric, General	0	45	45
12	Paint spray booth	Auto-body, General	4	83	87
13	Paint depth gauge	Auto-body, General	0	87	87
14	MIG welder	Auto-body, General	3	84	87
15	TIG welder	Auto-body, General	2	85	87
16	Fibre-glass molder	Auto-body, General	7	80	87

Chi-square analysis was used as the general frame work for evaluating whether there were significant differences between tools and equipment of the Jua Kali garages and those recognized by the manufacturers of the vehicles. The expected conditions are the availability of tools and equipment recommended by vehicle manufacturers and the observed responses to the questionnaire (i.e., from the mechanics). The results are shown in Table 4.2.

Table 4.2: Chi-square analysis of garage equipment

S.No	Requirement (Equipment)	YES		No		Total	df	x^2	significance
		f_o	f_e	f_o	f_e				
1	EFI auto data	13	39	65	39	78	1	34.666	0.0000
2	EFI scanner	2	39	76	39	78	1	70.205	0.0000
3	EFI code reader	11	39	67	39	78	1	90.205	0.0000
4	Fuel pump gauge	3	35.5	68	35.5	71	1	59.507	0.0000
5	Oil pressure gauge	6	35.5	65	35.5	71	1	49.028	0.0000
6	Cooling system analyzer	5	35.5	66	35.5	71	1	52.408	0.0000
7	Engine analyzer	0	35.5	71	35.5	71	1	71.000	0.0000
8	Repair manual	8	35.5	63	35.5	71	1	42.605	0.0000
9	Diode-transistor tester	5	22.5	40	22.5	45	1	27.222	0.0000
10	Digital multi-meter	31	22.5	14	22.5	45	1	6.422	0.2370
11	Wiring schematic diagrams	0	22.5	45	22.5	45	1	45.000	0.0000
12	Paint spray booth	4	43.5	83	43.5	87	1	71.735	0.0000
13	Paint depth gauge	0	43.5	87	43.5	87	1	87.000	0.0000
14	MIG welder	3	43.5	84	43.5	87	1	75.513	0.0000
15	TIG welder	2	43.5	85	43.5	87	1	79.184	0.0000
16	Fibre-glass molder	7	43.5	80	43.5	87	1	61.253	0.0000

The results show the typical observed frequencies (f_o) and expected frequencies (f_e) for presence of selected garage equipment used by mechanics in their various areas of specialization. ('Yes' means that the hand tool is present and 'No' means it is not available). It is assumed that statistically these two events are equally likely. Except for the digital multi-meter, Jua Kali mechanics do not have the tools recommended by vehicle manufacturers. From the above results, the null hypothesis that: observability does not play any role in the adoption of technology within the informal automobile mechanics in Nakuru town is rejected, since $p < 0.05$

International Journal of Academic Research in Business and Social Sciences
May 2016, Vol. 6, No. 5
ISSN: 2222-6990

(in fact p < 0.001); and conclude that observability plays a role in the adoption of technology within the informal automobile mechanics in Nakuru town.

4.2 Logistic Regression Analysis and Testing of the Hypotheses

4.2.1 Logistic Regression Analysis

A logistic regression analysis using the 'enter' method was conducted to generate relevant statistical information and produced the following tables. A test of the full model is presented in Table 4.3.

Table 4.3 Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	35.634	4	.000
	Block	35.634	4	.000
	Model	35.634	4	.000

All variables against a constant only model were statistically significant (Chi-square = 35.634, p < 0.000 with df = 11) indicating that the predictors as a set reliably distinguished between adopters and non-adopters and there is adequate fit of data to the model. This means that at least one or all of the predictors is significantly related to the response variable. Results in Table 4.12 shows that the -2 log likelihood chi-square distribution for the logistic regression has a p value of .000. Hence the study concludes that the four variables are statistically significant. According to Trammer and Elliot (2007), -2 log likelihood is a measure of how well the model explains the variations in the outcome of interest thus the significance of the variables imply they collectively explain variations in technology adoption among automobile mechanics operating in micro and small enterprises. The Hosmer and Lemeshow test of goodness fit was also generated as shown in Table 4.4.

Table 4.4: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.963	6	.682

A non-significance (p = 0.682) implies that the model adequately fits the data. Table 4.5 illustrates the summary of the model.

International Journal of Academic Research in Business and Social Sciences
May 2016, Vol. 6, No. 5
ISSN: 2222-6990

Table 4.5: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	105.527	.245	.765

Nagelkerke's R^2 of 0.765 indicates that there exist a moderately strong relationship between prediction and grouping. Overall the success of prediction was 82.7% (93.8% for non-adopters and 48.4% for adopters) as illustrated in Table 4.6.

Table 4.6: Classification Table

			Predicted		
			Adoption		
	Observed		0	1	Percentage Correct
Step 1	Adoption	0	90	6	93.8
		1	16	15	48.4
	Overall Percentage				82.7

To establish the effect of the hypothesized independent variables on the dependent, the odds ratio (OR), which estimates the change in the odds of membership in the target group for a one unit increase in the predictor was generated. It was calculated using the regression coefficients of the predictors as exponents or exp. SPSS calculated this value of the ln (odds ratio) and presents it as Exp (B) in the results printout in the 'Variables in the Equation' as shown in Table 4.7. In addition; to determine which particular independent variables had effects on the dependent variable, the wald statistics significant levels were also generated.

Table 4.7: Independent variables

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Relative advantage	-1.191	.528	5.091	1	.024	.304
Compatibility	2.555	.662	14.905	1	.000	12.868
Complexity	-2.080	.662	9.879	1	.002	.125
Observability	**1.535**	**.621**	**6.108**	**1**	**.013**	**4.642**
Constant	-1.846	.503	13.461	1	.000	.158

The odds ratio for the observability independent variable was 4.642 implying that a one unit increase in the variable increases the chances of a technology to be adopted by 4.6 times when all other variables are controlled. The wald statistics criterion demonstrated that observability made a significant contribution to technology adoption at 0.01 level of significance (p=0.013). This also leads to the rejection of the null hypothesis that observability does not play any role in the adoption of technology within the informal automobile mechanics in Nakuru town. The lack of these tools may be attributed to their prices because they are relatively expensive compared to most common hand tools. This lack of proper tools indicates that the quality of work done by the Jua Kali mechanics in the areas where these tools are supposed to be used is below standard. In addition, there are high chances that the diagnosis made by Jua Kali mechanics is wrong and may cause more problems to the vehicle in the long run.

CONCLUSION

Observability is where by an innovation use and effects must be visible by others. This variable was also found to contribute to the adoption of modern vehicle technology. Results indicated that this variable made was significant contribution (p=0.013) at 0.01 level of significance. Observability combined the mechanics attitude on relative advantage, compatibility and complexity of various modern automobile innovations. According to the Society of Automobile Engineers (SAE), all vehicles manufactured after the year 1996 must be OBD II compliant. And with the government of Kenya policy that all vehicles imported into the country must be less than 8 years old since manufacture, it then means that most petrol or gasoline operated vehicles in the country incorporate EFI systems. In the case of gear shifting mechanisms, 85% of automobiles manufactured globally use automatic or semi-automatic transmission systems; commonly known in Kenya as “automatic gearbox”. For this reason, a large number of automobiles in Kenya, including heavy commercial vehicles use automatic transmission systems. In this regard, the informal auto mechanics have no choice but to adopt these technologies if they are to remain in business. Overall for a technology to be adopted into the Jua Kali context, it needs to show relative advantage, compatibility and lack of complexity. In

addition users, especially mechanics need to see a technology in action and be given a chance to try out this technology themselves

REFERENCES

Adam Jolly (2011). The innovation handbook (2nd ed). London: Kagan Page.

Agarwal, R. and Karahanna, E. (2000), "Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage", *MIS Quarterly*, *24*, (4), 665-694.

Agarwal, R. and Prasad, J. (1998a), "A conceptual and operational definition of personal innovativeness in the domain of information technology", *Information Systems Research*, *9*, (2), 204-215.

Agarwal, R. and Prasad, J. (1998b), "The antecedents and consequents of user perceptions in information technology adoption", *Decision Support Systems*, *22*, (1), 15-29.

Barber, J. M. (2013). Emerging automotive technologies. *Technovation 49*; 45-78.

Chen, H.H. and Chen, S.C. (2009). The empirical study of automotive telematics acceptance in Taiwan: Comparing three technology acceptance models. *International Journal of Mobile Communications*, *7,* (1), 50-65.

Chen, S.C., Chen, H. H., and Chen, M.F. (2009), "Determinants of Satisfaction and Continuance Intention towards Self-service Technologies", *Industrial Management & Data Systems*, *109*, (9), 1248-1263.

Chiu, Y.B., Lin, C.P. and Tang, L.L. (2005), Gender differs: Assessing a model of online purchase intentions in e-tail service. *International Journal of Service Industry Management*, *16*, (5), 416-435.

Davis, F.; Bagozzi, R.; And Warshaw, R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science 35*, 982-1003.

Dillon, A. & Morris, M. G. (1996). User acceptance of information technology: Theories and models. *Annual Review of Information Science and Technology*. (31), 3-32.

Dishaw, M.T. and Strong, D.M. (1999),"Extending the technology acceptance model with task-technology fit constructs", *Information and Management*, *36*, 9-21.

Evan T. Straub (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research. 79* (2), 625-649.

Fendt J., Bureau S., (2010), "Small business education in a "grande nation": antinomy, opportunity or both ? : A *Handbook of Research in Entrepreneurship Education, 3:* 3, 6-109.

Gall, M., W. Borg and J. Gall (1997). Educational research. An introduction. New York:

Gefen, D., Karahanna, E. and Straub, D.W. (2003), "Trust and TAM in online shopping: an integrated model", *MIS Quarterly*, *27*, (1), 51-90.

Gratton, C. & Jones, I. (2004). Research methods for sports studies. London: Routledge

Growse, A. (2012). Automotive mechanics (8th ed.). New York: McGraw hill.

Innova Electronics. (2012). OBD 2 diagnostics. Los Angelos: Author.

John Karanja Ngugi, R.W. Gakure, Were M. Susan, Patrick Karanja Ngugi, Kibiru Charles Robinson (2012). The Influence of Intellectual Capital on the Growth of Small and Medium Enterprises in Kenya. *Journal of Business Management and Corporate Affairs* 1(1), 11-19. *Journal of Business and Economics 4* (6) 234-243

Kenya Motorvehicle Repairers Association (2014). Empowering the Kenyan Motorist. June Issue

Kithyo, I., Kipkurui, L. Okemwa & P. Korir, J. (2004). Modernization in automotive technology and performance of informal sector mechanics.: CIGR Journal *of Scientific Research and Development*. Invited Overview Paper, VI., Moi University.

Lee, M.C. (2009),"Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit", *Electronic Commerce Research and Applications*, *8*, (3), 130-141.

Liu, J., Zhang, S. and Hu, J., 2005. A case study of an inter-enterprise workflow-supported supply chain management system. *Information & Management*, *42* (3), 441-454.

M. Bowen, M. Morara, M. Mureithi (2013). Management of Business Challenges Among Small and Micro Enterprises in Nairobi. *KCA Journal of Business Management*. *3*,(1)

Morgan Stanley (2013). Autonomous cars: Self-Driving the New Auto Industry Paradigm. New York: Morgan Stanley & Co. International.

P. Kinyanjui (2011). *Managers' perceived effectiveness of competitive strategies adopted by Nation media group, Kenya in response to environmental changes.* University of Nairobi.

Rogers, E. M. (1995). Diffusion of innovations(4th ed.). New York: Free Press.

Saunders et al. (2003). Research methods for business students. Delhi: Pearson education ltd.

Saxena V. K. and Kehar Singh. (2011). Innovation, Non-Expertise and Inabilities of Developing Countries E-Banking and E-Commerce. *SHARE Journal of Multi-disciplinary Research & Studies*. 2 (3)

Venkatesh, V.; Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies*., Management Science 46* (2): 186–204.

Walczuch, R., van Braven, G. and Lundgren, H. (2000) "Internet adoption barriers for small firms in the Netherlands" *European management Journal*, *18* (5), 561-572.

Wanyeki, P. Machocho (2014). Adoption of new technology by jua kali automobile mechanics in Eldoret municipality. *CIGR Journal of Scientific Research and Development*. Invited Overview Paper, IX: Moi University.

Wanyoike, M. Daniel (2013). Determinants of ICT adoption by formal small enterprises in urban Kenya. JKUAT, Kenya.

World Bank (2013). Revolution in the automobile industry. *The International Journal of Entrepreneurship and Innovation*. *14* (2), 45-59.