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Keywords: household characteristics, modes of transport, travel behaviour.

Classification: FOR Code: 150799

Language: English

London Journals Press

LJP Copyright ID: 573333
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 20 | Issue 4 | Compilation 1.0

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The effects of land use change on travel decisions are turned out to be more significant for the reason that, the proportions for vehicle use rose beyond the values presented in the Urban Transport Planning Manual which were also applied in transport forecasting of the study area. At the same time, the rates of vehicle ownership and vehicle trips generated by the household are extremely high while the attitudes of using other alternative modes of transport are tremendously low.

Keywords: household characteristics, modes of transport, travel behaviour.

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I. INTRODUCTION

In most of developing countries including Tanzania, cities are facing both rapid urbanization and raised economic development for more several decades after 1950s. This is relatively short period of time for both urban and transport infrastructure to develop and establish workable proportions. Consequently, the enormous land use changes which are often manifested in cities of developing countries are noticeably caused by high rate of population increase, local and foreign investments and lack of housing stocks in urban planned areas. In this study, land use is described in a general sense including physical plots or parcels, houses or dwellings and social economic characteristics therein. Land use change is therefore presented in spatial dimensions explaining changes in location and sizes of living and

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working areas; and social economic characteristics of the spatial features.

The study objective was to determine factors affecting household characteristics and effective use of travel modes in urban planned areas and their possible interrelationship. To achieve this objective, two research questions were investigated; (1) whether there is correlation be- tween trip generated by an individual household and household vehicle ownership and use (2) whether change of land use influences individual household to travel by motorized transport than other alternative modes.

In determining relationships between household characteristics and effective use of travel modes, data from different sources were applied. The main sources of data were Nation Population and Housing Report of 2012, Urban Planning Reports and Travel Surveys in the study area. Census report provides information about average household sizes, population and other socio-economic data. Planning documents provide information about size of land parcels, parcel uses, house hold sizes, population, household employment and vehicle ownership, vehicle trips per household and vehicle trip per residential land use categories. These are values provided in Urban Land Use and Transport Manual (ULTM) of 2008 which were also applied in estimating and forecasting travel during preparation of development plans of the study area. Also, existing household characteristics and travel attributes were determined by conducting Study Area Travel Survey. The survey was carried out on March and April 2013, and 304 respondents from households were interviewed.

The major statistical methods applied in this study are linear correlation and cross-tabulation. Two major findings have been observed: first is about relationships between household characteristic variables and trips generated by individual household for works, school, shopping and recreation by using private car, public transport, walking and cycling modes. The results indicated strong positive associations between work trips by using private cars and household vehicle ownerships and income, negative association between work trips generated by using public transport and household employee, at the same time negative association between work trips generated by walking and cycling, and household vehicle ownership. School, shopping and recreation trips were also tested whereby private car trips for school are positively associated with household income and employees, while walking to school is positively associated with school going children. Shopping by private car is associated with vehicle ownership, but shopping by public transport is associated with household size and unemployed adults. Recreation by private car is positively associated with income while, recreation by public transport, walking and cycling are positively associated by unemployed adults.

Hence, rather than explaining the relationships between household characteristics and use of travel modes, the paper also give emphasizes to observed gaps on transport planning policies. It appears that, there is lack of provision of separate, safe and secured sidewalks in collector and feeder roads and lack of enforceable laws to protect walkers and cyclers from accidents and environmental risks like dusts, sun, rain and other pollutions. Most of walkers and cyclers feel unsafe and unsecure when using roads, and therefore opt to use motorized transport. The study therefore recommended the importance of minimizing ownership, use and dependencies of motorized transports together with mechanisms of promoting use of non-motorized transport in Dar es Salaam and other developing cities.

II. LITERATURE REVIEW

Land use change, household characteristics and individual travel decisions interact, but these relationships are complex with various interactive effects. Land use change affects the change of household characteristics such as household size, employment, income, car and license ownerships. At the same time, change of household characteristics affects individual travel attitudes; and all

these conditions affect land use activities (Litman, 2009; Wegener, 1998 and Johson, 2007). Previous and current research efforts are looking for ultimate solutions for improvement of traffic problems caused by a change of travel behaviour in urban planned areas. Ewing and Cervero, (2010) provide a methodological analysis of travel behaviours change in relation to land use change. The study has documented land use transformation era in cities in the US and UK in the period 1935-1970s whereby three major factors such as urbanization, industrialization and commercialization were major forces of land use change. The analysis gives the quantification for the rates of car ownership and car use before land use change (planned and forecasted ownerships and use) and after land use change.

Generally, this study observed that, most cities which experienced rapid land use change were also affected with high rate of vehicle ownership, use and dependencies. This is from the fact that, as car ownership is increasing, using a car also became a habit for many individual households. As the result, car owners maximize the use of private cars in normal movements, and minimize the potential use of public transport and non-motorized transport such as walking, cycling and others (Litman, 2009).

Boarnet and Crane, (2001) identified different strategies which have been practiced in different cities in developed and developing counties, and showed positive results in minimizing effects of land use change on travel behaviour. The first strategy was based on Sustainable Land use and Transport Approach (SLTA) which intended to reduce motorized mobility in European cities through awareness and publicity. The suggested ways of restraining car ownership, use and dependency attitudes encompassed five 'As' such as awareness, acceptance, attitude, action and assimilation. Awareness included making the public and travellers gaining awareness of the problems caused by car use example congestion, pollution, accidents, cost of fuel, maintenances and parking, risk to crime and other difficulties experienced when travelling by car. Acceptance was about accepting personal responsibility for contribution to the problems and also contributing to the solutions, otherwise acknow- ledging the possibilities to change personal travel behavior. Attitude was about changing people attitude towards alternative modes of transport rather than private car, and making sure there existed suitable alternative modes. Action was based on commencement of different activities or programs in order to reduce car use by making sure there are actually a viable alternative mode and committed actions for changing car ownership, use and dependency. Assimilation was about incorporating new behaviours such as drive less, walking and cycling into everyday life and maintaining the change from local up to national and short to long term strategies.

The achievements for SLTA strategy were significantly low because of uncoordinated functions between transport planners and urban designers. Failure of the first strategy led to a second strategy called Centeredness and Connectivity (centricity). In this strategy, jobs and commercial activities have to be located on central business districts and town centres and creating roads and walkways to connect them. Degree walkways and roads were connected to reduce vehicle travels and hence improved walking and use of other alternative modes. Typically, 30-60% of commuters to major commercial centres used alternative modes compared with 5-15% at dispersed locations (Boarnet and Crane, 2001).

Compact development which entails high density and mixed land uses are another strategy for minimizing vehicle ownership, use and dependency. Land use mix refers to locating different types of land uses such as residential, commercial, institutional, and recreational close together. This can occur at various scales, including mixing within buildings such as ground-floor retails with offices and residential above, along streets, and within neighbourhoods. It can also include mixing housing types and price ranges that accommodate different demographic and income classes. Increased mixed land uses reduce travel distances and allow more walking

and cycling trips. It can reduce commute distances, particularly if affordable housing is located in job-rich areas and mixed-use area residents are more likely to commute by alternative modes (Bath, 2007 and Ewing et al., 2010).

The quality conditions of walking and cycling also affect travel decisions in several ways. Improved walking and cycling conditions tend to increase non-motorized travel, increase transit travel, and reduce automobile travel (Mackett and Brown, 2011). Walking and biking conditions are affected by the quality of sidewalks, crosswalks, paths, bike parking and changing facilities. Also, are influenced by network connectivity of sidewalks and paths, security and safety to people cycling facilities and environmental quality. Non-motorized transport improvements can leverage additional vehicle travel reductions by helping create more compact, multi-modal communities where residents own fewer vehicles and travel shorter distances (Jerry, 2003; Sassen, 1991 and Ewing et al., 2010).

Congestion charges are also applied as mechanisms of controlling vehicle use and dependency. Börjesson et al., (2012) recognized the positive achievements for the implementation of congestion charges in the Central Business Dis- trict of Stockholm, Sweden. The study realized that, when the city decides to enforce congestion charges, people opt to choose alternative modes, especially using public transport which fortuna- tely lowers private cars in the CBD. The assess- ment for the decrease of private car passing across the cordon lines to CBD were made in six years 2006 up to year 2011 by referring to private cars entering the CBD in 2005 before imple- menting the congestion charge system. The comparison indicated almost the same rates of annual decrease of vehicle entering the CBD, whereby in the year 2006 vehicles decreased by 21 percent, and in the year 2007, 2008, 2009, 2010 and 2011 they decreased by 19, 18, 18, 19 and 20 percent respectively. The study concluded that congestion charges were actually effective in controlling car use, and reasonably controlled travel behavior. However, for new implementers of congestion charging system, the study suggested more emphasis on political and public acceptability, and great provision of reliable and affordable public transport and other non-motorized modes.

In Tanzania, there is no specific study which has been conducted to address relationships between household characteristics and effective use of travel modes. But some of recommendations from different researchers were taken as advantage for this study. Tardiff, (2007) tried to relate income group and travel behavior. He found that, low income people living high populated areas were weakly associated with vehicle ownership and use, and greater percentage of travellers of this category depended on public transport, cycling and walking. But middle-income people living in mixed use and high populated areas were strongly associated with vehicle ownership and use and greater percentage of travellers depend on private cars. However, higher income people living in low density areas are also associated with high vehicle ownership and use.

Kombe, (2011) also studied on relationship between plot sizes and household employees. This study came up with two major findings. First is location of employees, whereby about 70% of urban employees are dwelling in planned medium and high-density areas. But planned medium and high-density residential areas are the most areas affected by land use change in Dar es Salaam city. Second household employees were the most car owners and best vehicle trips generators in Dar es Salaam city. Therefore, despite of urban employees being associated with high and medium residential areas but also, they are the most car users, which cause traffic congestion during morning and evening peak hours.

Brief review was made also on relationship between traveller attitudes and travel behavior. Sunkanapalli, et al. (2000) gives the nature of association between attitude and behavior in transport perspectives. Simple analysis of travel attitudes is based on respondents who say “yes” to best desired transport mode and ‘no’ to other

alternative modes. It is better to ask the respondent whether they intend to use the bus and a measure of how often they'll use the bus (how many times a week and for what trip purposes). Carefully worded questions are the best step towards better prediction and modelling travel behavior.

The difference between desire and intention also has shown a great importance in this study. Desire is mostly applied where a respondent describes to himself a preferable mode of transport, but intension is applied where the respondent describe himself what mode is intending to use (Gauthier and Shaw, 2008). The attitudes of travellers in rapid urbanized cities should be analysed from individual or household intentional travelling data, in order to reveal the change of travel behavior. The most probe questions should base on tomorrow or future travel plan, however previous travel diaries can also be applied (Golob, 2001).

III. METODOLOGY

The study area presented in Figure 1 was selected based on the criteria that it had been planned and developed for more than twenty years, covered three or more neighbourhoods and had undergone fast land use change. Two categories of data were collected in the study area; the first category was socioeconomic data and the second category was travel attribute data. Social economic data were mainly collected from planning reports for the study area, city environ- mental profiles, population census reports and city strategic plans.

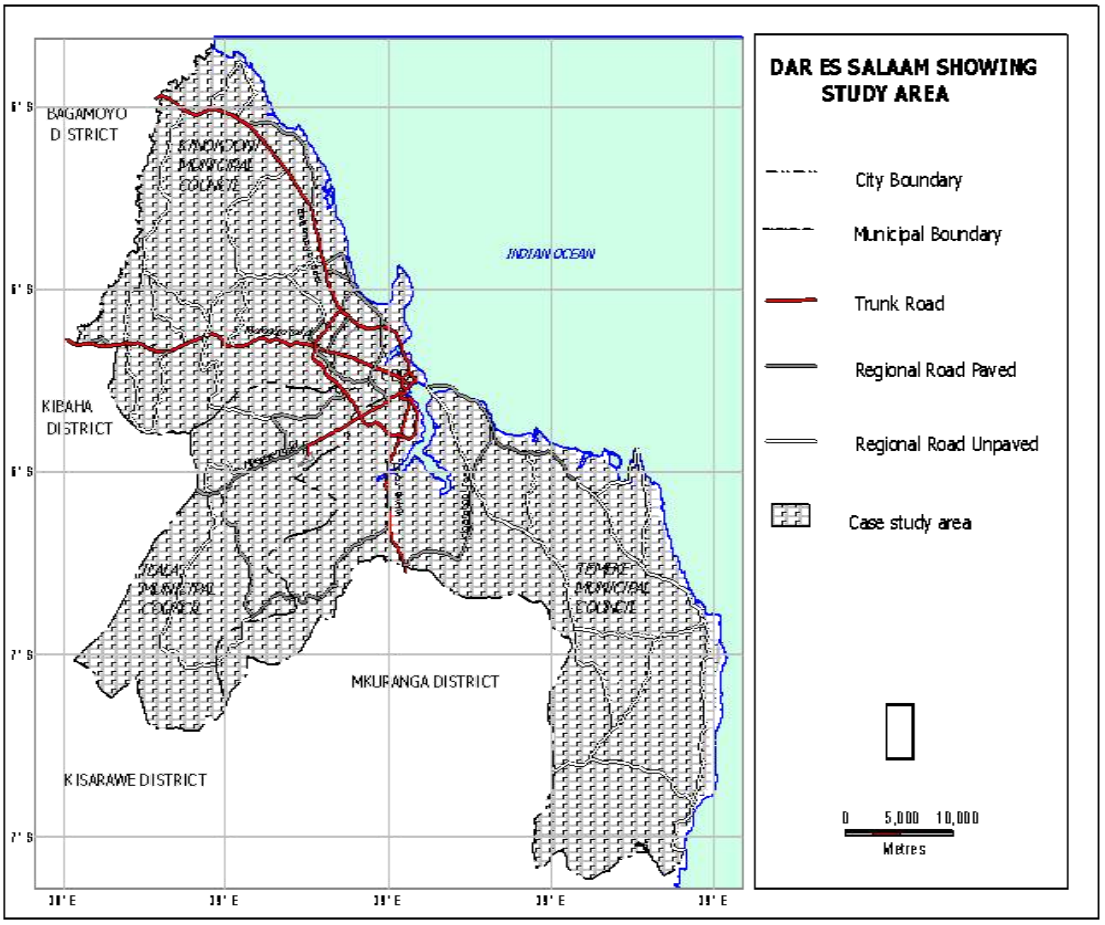

Figure 1: Dar es Salaam City Map showing the location of study area

Travel attribute data were collected by performing household survey in the study area and three steps were followed. The first step was deter- mination of sample size, whereby a random sampling method

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was applied to determine the suitable number of respondents in the study area. The responding population constituted a total number of houses or dwelling units which were 6743 houses. The sample size of 377 houses or dwellings was obtained by the formula $n=N/(1+N(e)^2)$ where n is the sample size, N is total number of houses which is the population, and e is the level of precision, that is 0.05 at 95% confidence level (Glenn 1992). A uniform of 1 house out of 18 houses or dwelling units was selected sample from population.

The second step was a selection of interviewed households. The interview was done for one household in the sampled house or dwelling unit because most of the sampled houses or dwelling units contained two or more households. The process included interviewers visiting physically a sampled house and interviewing one member of selected household. Interviews were conducted on weekend days in order to find adults at home, but questions were asked for the travels made on 'one' of the previous working days. About 304 households were interviewed which is the achievement 81 percent of sample size. The main reasons for interviewing 81 percent included inaccessibility of sampled houses, unavailability and unwillingness of interviewees.

The third step was data collection which was carried out at individual and household level. At individual level, the interviewee was required to state the chain of trips made for the previous working day. For each trip, the provided data included start and end times, origin and destination locations, purpose, mode of transport used and distance travelled. At household level, the interviewees were required to provide data for household characteristics and travels made by each member of household. Household charac- teristic data included household size, emp- loyee, vehicle ownership, children of pre-school and school age, adults, licensed annual income. While, provided household travel data were the time each member started the first trip from home, time back home, purposes of travels and transport used.

IV. VARIABLE DEFINITION

4.1 Dependent Variables

Work trips - trips generated by individual households for work purposes
School trips - trips generated by individual household for school purposes
Shopping trips - trips generated by individual household for shopping purposes
Recreation trips - trips generated by individual household for recreation purposes

4.2 Independent Variables-Household Characteristics

Household size- number of people in the household
Employees- number employees in the household
Unemployed- number of adults in the household who are not employed
Owned vehicles- number of vehicles owned by the household
Licensed drivers- number of licensed drivers in the household
School children- number children of school age between 6-18 years in the household
Income- household annual income in million Tanzanian Shillings

4.3 Relationships between Variables

This sub section intends to describe the relationship between household characteristics and travel variables. Household characteristics variables include household size, income, employment, vehicle ownership, licensed drivers, school going children and adults, while travel variables include number of trips for work, school, shopping and recreation purposes by private car, public transport, walking and cycling. The linear correlation coefficient 'r' was applied to measure the strength and direction of a linear relationship between two variables. The value of r varies between - 1 and + 1 where a positive value indicates a positive correlation that, the dependent variable tends to increase as the independent variable increases, while a negative variable indicates the

opposite tendency. A strong positive linear correlation is obtained if *r* is close to +1, and strong negative correlation is obtained if *r* is close to -1, and no correlation is obtained if the value *r* is close to 0. A value near zero means that there is a random or a non-linear relationship between the two variables. In this study, if the absolute value of *r* is great or equal to 0.5 it is generally described as strong (positive or negative) correlation, whereas if absolute value of *r* is less than 0.5 it is generally described as weak positive or negative correlation. The significance of the correlation between the variables is measured in form of a 95 percent confidence levels at *p*-value ≤ 0.05.

V. RESULTS

5.1 Work Trips

Table 2 presents the relationships between household characteristics variables and the daily number of trips generated by the household members using private car, public transport, walking and cycling modes for work purposes. Household vehicle ownership and income have strong positive correlation with the number of work trips by private car at r=0.813 and 0.565, respectively, and weak positive correlation with the number of household employees and licensed drivers at r=0.239 and 0.122, respectively. The number of work trips by public transport is weakly positively associated with the number of employees (r=0.264) probably because most of the employees use private vehicles, but it is strongly negatively associated with vehicle ownership (r=-0.581), and weakly negatively associated with income and number of licensed drivers a(r=-0.355 and -0.116). The number of walking trips for work purposes is weakly positively associated with the number of household employees (r=0.164), but weakly negatively associated with vehicle ownership at r=-0.147. The number of cycling trips for work purposes is weakly negatively associated with vehicle ownership (r=-0.123). Household size is insignificant to the number work trips for any mode of transport.

Table 2: Correlation between Work Trips and Household Characteristics Variables

Variables	Coef/ Sign	Work trips by Private car	Work trips by Public transport	Work trips by walking	Work trips by cycling
Household size	Coef.	0.072	0.073	-0.078	-0.009
	Sig.	0.209	0.206	0.185	0.878
Household employee	Coef.	0.239*	0.264*	0.164*	0.082
	Sig.	0.000	0.000	0.004	0.154
Household Licensed drivers	Coef.	0.122*	-0.116*	-0.029	-0.009
	Sig.	0.034	0.043	0.619	0.881
Household Income	Coef.	0.565*	-0.355*	-0.101	-0.075
	Sig.	0.000	0.000	0.080	0.191
Vehicle ownership	Coef.	0.813*	-0.581*	-0.147*	-0.123*
	Sig.	0.000	0.000	0.010	0.032

** Correlation is significant at p-value ≤ 0.05.*

5.2 School trips

Table 3 presents the relationship between household characteristics variables and the daily number of trips generated by household members using private car, public transport, walking and cycling modes for school purposes. The number of school trips by private cars is weakly positively associated with household size, number of children in school age and vehicle ownership at r=0.288, 0.311 and 0.254, respectively. The number of school trips by public transport is also weakly positively associated with the number of children in school age (r=0.201). The number of school trips by school bus is weakly positively associated with the number of employees in the household, the number of children in school age and household income (0.453, 0.126 and 0.186). Walking to school is weakly positively associated with the

number of employees in the household (r=0.127) and strongly positively associated with the number of children in school age (r=0.638). This reflects that most of school children walk to school rather than using motorized transport because most of the nursery, primary and secondary schools are located at walking distances. Most of school children who use school buses and other motorized transports are students who normally travel to schools located outside of the study area. The few cycle trips to school are positively associated with the number of children in school age (r=0.210).

Table 3: Correlation between School Trips and Household Characteristic Variables

Variables	Coef/ Sign	School trips by Private car	School trips by Public transport	School trips by school bus	School trips by walking	School trips by cycling
Household size	Coef.	0.288*	0.090	0.017	0.021	0.057
	Sig.	0.000	0.118	0.588	0.719	0.321
Household employee	Coef.	0.023	-0.039	0.453*	0.127*	0.004
	Sig.	0.690	0.497	0.000	0.026	0.948
Household school going	Coef.	0.331*	0.201*	0.126*	0.638*	0.210*
	Sig.	0.000	0.000	0.029	0.000	0.000
Household Income	Coef.	-0.010	0.045	0.186*	-0.072	0.036
	Sig.	0.863	0.439	0.001	0.212	0.529
Vehicle ownership	Coef.	0.254*	-0.067	-0.022	-0.082	-0.039
	Sig.	0.004	0.242	0.705	0.155	0.493

** Correlation is significant at p-value ≤ 0.05.*

5.3 Shopping Trips

Table 4 presents the relationships between household characteristics variables and the daily number of trips generated by household members of using private car, public transport, walking and cycling for shopping purposes. The use of private cars for shopping is strongly positively associated with household vehicle ownership (r_=0.503), and weakly positively associated with income and number of employees in the household (r=0.395 and 0.13). The number of shopping trips by public transport is weakly positively associated with licensed household members and household size (r=0.248 and 0.471). The number shopping trips by walking is weakly positively associated with at the same variables (r= 0.368 and 0.125). Cycling trips for shopping are uncorrelated with all variables.

Table 4: Correlation between Shopping Trips and Household Characteristic Variables

Variables	Coef/ Sign	Shopping trips by Private car	Shopping trips by Public transport	Shopping trips by walking	Shopping trips by cycling
Household size	Coef.	0.005	0.471*	0.368*	0.084
	Sig.	0.932	0.000	0.000	0.146
Household employee	Coef.	0.130*	0.081	0.062	0.069
	Sig.	0.023	0.160	0.279	0.231
Household Licensed drivers	Coef.	0.009	0.248*	0.125*	-0.044
	Sig.	0.874	0.000	0.029	0.440
Household Income	Coef.	0.395*	-0.015	0.088	-0.025
	Sig.	0.000	0.799	0.128	0.668
Vehicle ownership	Coef.	0.503*	-0.111	-0.023	0.035
	Sig.	0.000	0.053	0.686	0.539

** Correlation is significant at p-value ≤ 0.05.*

5.4 Recreation Trips

Table 5 presents the relationships between household characteristics variables and the daily number of trips generated by household members using private car, public transport, walking and cycling for recreation purposes. The number of recreation trips by private cars is weakly positively associated with household income and vehicle ownership (r= 0.222 and 0.343). The number of recreational trips by public transport is weakly positively associated with household size, unemployed adults and vehicle ownership r=0.387, 0.144 and 0.126). The number of recrea- tional trips by walking is weakly positively associated with household size, unemployed adults and income (r= 0.359, 0.208 and 0.174). The number of recreational trips by cycling is weakly positively associated with unemployed adults, household income and vehicle ownership (r=0.209, 0.139 and 0.167). There seems to be a clear tendency that the more unemployed adults there are in a household, the more recreational trips the members make.

Table 5: Correlation between Recreation Trips and Household Characteristic Variables

Variables	Coef/ Sign	Recreation trips by Private car	Recreation trips by Public transport	Recreation trips by walking	Recreation trips by cycling
Household size	Coef.	0.010	0.387*	0.359*	0.273
	Sig.	0.866	0.000	0.000	0.000
Household employee	Coef.	0.045	0.118	-0.008	0.025
	Sig.	0.432	0.039	0.896	0.666
Unemployed adult	Coef.	0.062	0.144*	0.208*	0.209*
	Sig.	0.284	0.012	0.000	0.000
Household Income	Coef.	0.222*	0.103	0.174*	0.139*
	Sig.	0.000	0.072	0.002	0.015
Vehicle ownership	Coef.	0.342*	0.126*	0.130	0.167*
	Sig.	0.000	0.028	0.024	0.003

** Correlation is significant at p-value ≤ 0.05.*

VI. DISCUSSION

This section intended to describe the factors that influence change of travel attitudes, and the mechanisms of reducing vehicle ownership and use together with increase for the use of alternative modes of transport in urban planned areas. Categorically, three major items were considered in this discussion; first is about balancing job employment ratio and distance travelled to employment locations, second is about improving and promoting public transport services, and third is concerning with non-motorization.

A balance between number of employee and employment opportunities together with the spatial distribution of employment locations is definitely concerned in reducing vehicle ownerships, use and dependency in urban planned area. As it was depicted in the study area, household employment rate is very much increasing, but the higher rate of employees is working a distance far from the study area which makes them to commute long distances and use more times of travel for work. This situation has influenced individual household employees to opt ownership of more vehicles, at the same time using private cars and public transport than using other alternative modes of transports. Another obser- vation is that, household employees are the most car users. This depend on the fact that household employees have strong positive relationships with private car trips generated by individual household for work, school and shopping activities, and strong negative association with private car trips generated for recreation activities. It implies that, household employees have great influence in vehicle ownerships, use and dependency. Therefore, balan- cing job employee and spatial distributions of employment locations will pro-

bably reduce the rate of car owned by individual household at the same time decrease the use and dependence of motorized transport among urban employees.

The increase of vehicle ownership and use among individual household can be minimized by improving and promoting public transport services in urban areas. The observation from the study area indicated great use of private cars for the daily trips made by individual household; however, most of private car users opt to use them unwillingly. The great ownership and frequent use of private vehicles are influenced by the limited and unreliability of public transport services in Dar es Salaam City. Improving and promoting use of public transport certainly decreases the rate of car use at the same time reduce traffic congestion, effects of vehicle emission and improve community health and liveability.

The extreme use of motorized transport can be minimized by enacting 'non- motorization' or 'active transportation conditions' in urban area. Non-motorization includes provision of quality walking and cycling sidewalks which are safe and environmentally friendly for walkers and cyclers. As found in the study area, roads have no sidewalks and cycling paths. Walkers and cyclers use the same road with vehicles, which risks their life and, in most cases, cause accidents. Therefore, most of travellers opt to use either public transport or private cars even for short working distances. As indicated in the study area, the use of non-motorized transport is affected by lack of provision of non-motorized infrastructures such as side sidewalks, crosswalks, paths, bike parking and changing facilities. Also, roads have no specific signs to control traffic speeds on crosswalks, and most of drivers do not follow the protection sign. Therefore, non-motorized travellers face difficulties to cross the roads. Walkers and cyclers feel unsecured and unsafe when walking or cycling, and environment is not friendly for walking and cycling. They are not attractive and are exposed to sun, dust, rain and pollution.

VII. CONCLUSION

This study was conducted purposely for addressing the effective use of travel modes in relation to the change of household characteristics influenced by the land use change in urban planned areas. From previous studies we found that, land use change which is legally accepted and operationalized in Tanzania affect the planned area with rapid population increase and building changing use (Gordian et al., 2013). This study also has realized the sequential relationships between change of land uses, household characteristics, travel atti- tudes and use of travel modes. When land use is changed from single storey and single use to multi-storey and mixed use developments, it resulted with increase of population and number of people in the house or dwelling unit, together with increase of household characteristics such as household sizes, employees, annual income, school going and adult age, licensed drivers and vehicle ownerships. These changes also resulted to increased trips generated by individual household per day. Therefore, the increased population, household attributes and trip rates per individual households influence the ownerships and use of motorized transport than other al of transport in urban areas.

Change of travel attitudes to the maximum use of motorized transport were realized in this study. The observed higher rate of vehicle ownerships, use and dependency are influenced by three major factors such as disparity between employees and job locations, unreliable public transport and difficulty for use of non-motorized transport. Most of employees travel long distances to job locations and certainly have to opt use of motorized transport than other alternative modes. However, unreliable public transport services and lack of good quality and environmentally friendly sidewalks in urban roads influences more people to own and use private vehicles than other modes of transport.

The study has recommended the adoption of new urbanism concepts such as Transit Oriented Development (TOD) and compact city whereby at least 30 percent of employees can be employed in the

planned area. Also, public transport should be much promoted and reliable and therefore can reduce about 25 percent of private car dependency in the city. Also, roads should provide sidewalks which are safe, secured and attractive and separated from walkers and cyclers. At the same time, government should promote the use of alternative modes of transport by providing environmentally friendly walkways. This can be achieved by building trees to protect sun and dusts, and where necessary to build sheds along sidewalks.

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