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Trends and Factors Affecting the Use of Non-Motorized Modes of Transportation in Hawassa City, Ethiopia

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Abstract
Initial modes of transportation for human beings were non-motorized. However, due to development in transport technology and requirement, these modes have been partly or fully replaced by motorized vehicles depending on the development level of the given country. Invention in motorization contributed for further advancements. Motorization has multifaceted benefits. However, individual risks ranging from property damages, health problems, injuries and deaths from traffic accidents and environmental problems due to construction of infrastructure and gas emissions are also the serious threats. Consequently, many nations of the world have started to incorporate non-motorized modes in their transportation systems in order to tackle such negative effects of motorization. Acceptance in non-motorized transport is getting a wide horizon at the world scale because it is economically feasible, environmentally less damaging and socially inclusive. As true for many developing countries, dominant mode of transportation in both urban and rural areas of Ethiopia is still non-motorized. Hawassa with a population of 183,027 (2010 projection) is one of the emerging cities in Ethiopia, had been greatly experiencing the use of non-motorized transportation. However, currently this situation is practically changing since motorization is slowly becoming the main mode of transportation in the city. The dominant public mode of current transportation is Bajaj (auto rickshaws/three wheelers) which have low occupancy in their nature showing the need of numerous fleets to transport relatively few people. The exhaust from these fleets, road congestions, noise pollutions and so on is becoming motorization-related problems in the city. In view of this, the paper has focused on trends in non-motorized modes of transportation and associated factors. Data sources were respondents from a household survey in Hawassa city. Descriptive and inferential statistics are used for analyses. The result has shown that modes of transportation and reasons for walking and bicycling are not independent.
Keywords: Non-motorized modes of transport, Environment, Walking and bicycling

1. Introduction

Hawassa is one of the emerging secondary cities of Ethiopia in Southern Nations, Nationalities and People's Region. It is located at 275km from national capital (Addis Ababa) on Addis Ababa to Nairobi International Road. The city with an estimated area of 157.21 square kilometers and population of 183,027 (2010 projection) is one of rapidly growing urban centers in Ethiopia. The evolution of non-motorized transport has the same age with evolution of human beings, because modes used for movements initially were totally on foot. The use of non-motorized transport continued in urban areas as well because ancient cities around Mesopotamia, Indus Valleys, etc. were initially small in size Later on, increase in size of cities physically and population wise generated needs to motorized transportation to access goods and services which necessitated a need for provisions of transport infrastructure and facilities. Development in transportation has become widened, more intensified and technologically advanced following industrial revolution and rapid urbanization worldwide. Though enhanced motorization facilitated movements and contributed for further advancement of human society, it was not without associated negative effects. Significant negative impacts on the environment and human health have started to emerge. In this regard, Jafri (2011:103) pointed out that the growth of motorized vehicles in Lucknow (India) is 10.38 per cent annually (based on the 2004-05 data). The same research indicated that the share of passenger auto three wheelers growth share for the period was 2.78 per cent. Transport development related problems against individual, social and environment, have forced planners, decision-makers and society in large to rethink and see into importance of non-motorized modes of transportation in general and at least importance of its integration to motorization in particular. The non-motorization alternative, in particular,

reference to encouraging walking and bicycling aimed at reducing negative impacts on environment and health problems while integration refers to the use of diverse modes that incorporates motorization with non-motorization in planning, implementation and management of urban transportation infrastructures and services.

According to report of International Energy Agency (IEA) (2012:57) the share of road transport was 89 per cent of the total motorized mode at the worldwide. This report indicated road transport has been the main contributor to the increase in overall transport energy consumption between 1990 and 2005. Working paper by Kassahun Haile Mariam (2010:4) has revealed that fuel consumption for Ethiopia in 2007 was 21 kilo grams per year per capita. From total fossil-fuel import in Ethiopia, 65 per cent was used by road transport while from total carbon dioxide emissions, 50 per cent was from road transportation in Ethiopia showing clear implications of motorized modes human health problems and air pollutions. This tells us that motorized modes of transport are known for their increased risk of safety and human health problems due to high rate of car accidents and variety of resultant pollutants produced in the system. World Bank reported illuminated motorization associated life risks at the world scale. The report reiterated worsening road safety in the whole world being responsible for half a million people death in traffic accidents and for many more injuries every year (The World Bank 1996:65). Adding on this, the World Bank suggested provision of routes and parking for bicycles even at low cost to incorporate non-motorized transport so as to minimize effects of environmentally damaging modes of transportation.

According to United Nations report, cities with more sustainable transport systems have been able to reduce their ecological footprints from their reduced use of fossil fuels, as well as through decreased urban sprawl and decreased dependence upon car-based infrastructure. The agenda for large cities was to have more sustainable transport options in order to reduce traffic while reducing greenhouse gases by 50 per cent by at least 2050, in line with the global agenda set through the Intergovernmental Panel on Climate Change (IPCC) (UN Habitat, 2009:123-124)"

The use of non-motorized mode is not a new experience, particularly for developing nations, though some of the highly-developed countries like Netherlands also have been using it. Practices show that the use of bicycles was not only for physically small cities. For instance, in big cities like Beijing, cycling was reported as an integral component of urban transport. It was reported that in African countries like Nairobi and Dares Salaam, nearly half of the trips were entirely made on foot, whereas for the remaining share, a combination was made of public transport and walking. According to Hook, non-motorized modes of transport were important because they generate no air pollutions, no greenhouse gases, provide aerobic exercise, reduce dependence on imported fuels and improve accessibility and social cohesion (Hook W. 2003: 5-8). Benefits mentioned by Hook indicated that non-motorized transport is economically affordable, socially inclusive, and environmentally feasible. Besides, urban poor which are majorities in almost all developing countries rely on non-motorized modes of transport to satisfy their travel needs mainly due to economic reasons so that encouraging these modes by providing necessary infrastructures and policy support would have great value in the efforts of socio-economic development and poverty reduction.

Regardless of many benefits from non-motorized modes, they were highly constrained by lack of infrastructures, facilities for walking and bicycling and by policy negligence. The use of walking and bicycling in developing countries were usually because of lack of alternatives due to economic reasons. However, walking and bicycling received attention in developed countries since they do not have the problem of emissions and for physical fitness and health rationales. However, realization of this approach faces problems because in many cities of developing countries circumstances are not permissive for walking and cycling. According to Litman T., 2003: 581,

> *Many areas have inadequate sidewalks, crosswalks and paths and opportunities for pedestrian and cycling facilities and connections are overlooked. Many roads are not designed or maintained to accommodate cycling and other slower modes, putting cyclists and car users at risk, or forcing them onto pathways where they conflict with pedestrians*

Policy and strategy that support the use of renewable energy and the need to reduce fossil energy consumption by maximizing the use of non-motorized transport for relatively small cities at the world scale is essential to protect environment and individual safety. A clear policy structure with priorities in the following order of importance was suggested by Knoflacher which includes (i) pedestrians, (ii) non-motorized vehicles, (iii) public transport, (iv) car traffic only for special purposes (2009:6).

United Nations report was in harmony with Knoflacher's propositions in such a way that walking and cycling should be the priority for sustainable transport. The report pointed out that:

> *Policies must support walking as a prime mode of transport, through the provision and maintenance of walkways. Cycling and walking should be recognized as important components of urban traffic. Safe cycle ways and footways should be provided, while the attractiveness of these modes of travel should be enhanced by ensuring proximity of work-places and services to residential quarters" (UNCHS HABITAT 2001:6-7).*

Policy environment from experiences of different countries has shown that they were taken measures to ensure

sustainability of the transportation systems. They saw transport sustainability from the view point of transport that satisfies the mobility need of their people with minimal negative environmental effect. This can only be achieved if all alternative components of transport systems are well coordinated. The experience from South Africa shows that the nation initiated non-motorized transport use project named Shova Kalula as part of transport policy for 800,000 primary and secondary-level students. Shova Kalula comprises of low-cost, new and used bicycles and a delivery chain that includes a container-based shop, a cycle repair training course and light engineering modifications to produce load carrying work-cycles (Gwala 2007:20).

This paper assessed trends in non-motorized modes of transport and linked factors in Hawassa City based on the authors own household survey. The paper has shown up the level of provisions of infrastructure, reasons for walking and bicycling and related benefits of non-motorized modes of transportation. Data was gathered from 196 respondents of households using systematic random sampling techniques. Chi-square test was applied to see independence of selected samples. The study results have shown that modes of transportation and reasons for the use of non-motorized modes have linear associations.

2. Non-Motorized Modes of Transport in Hawassa City:

Predominant mode of transport in Hawassa has been walking and bicycling up until recent years. Following increase in population size, physical increase in city size and improvement in road infrastructures, Bajaj (auto rickshaws/three wheelers) have become a dominant public mode of transport. Owing to city size, walking and cycling are permissive and economically, environmentally and socio-culturally efficient system of transport. However, the trend is that walking and using bicycles as a mode of transportation is getting lesser and lesser.

The trend of substituting non-motorized transport mode by low occupancy motorized mode (e.g. auto rickshaws) is a consequential problem. In the same way, there is not defined strategy in the plan to reduce negative environmental impact associated with motorized modes of transportation. The Problems associated with decrease in walking, and bicycling are partly related to failures of initial city plans to ensure the provision of necessary facilities for walking and bicycling, which may have a role of increasing efficiency in transport system reducing unnecessary travels. One aspect of the problem arises from city design approach that in an existing plan road network, designs focused only on motorization.

3. Characteristics of Household Respondents

Out of total surveyed, 196 household's heads 169 or 86.2 per cent found to be males and 27 or 13.2 per cent were female. This is primarily because in Ethiopian culture generally household heads are men. Those 27 female heads are probably either unmarried, or divorced or widowed. Majority of household respondents were married accounting more than 79 per cent of the total surveyed household heads. Divorce cases are very minimal only accounting for about 3 per cent of the total About 31 per cent of respondent's have households are with above seven members indicating that household size is big (Table 1a).

Table 1a. Gender, Marital Status of Head of Sample Households and their Household Size in Hawassa City 2013

Sex Wise Head of Households			**Marital Status**			**Household Size**		
Sex	**No.**	**%**	**Status**	**No.**	**%**	**Class Interval**	**No.**	**%**
Male	169	86.2	Single	16	8.2	<3	27	13.8
Female	27	13.8	Married	155	79.1	3-6	107	54.6
…	…	…	Divorce	6	3.1	7-10	48	24.5
…	…	…	Widow	19	9.7	>10	13	6.6
…	…	…	…	…	…	…	1	0.5
Total	**196**	**100.0**	**…**	**196**	**100.0**	**…**	**196**	**100.0**

Source: *Based on Survey Conducted by the Authors in 2013*

In Tables 1b, c and d average monthly income, educational level and employing organization of respondents have shown. Income distribution among class intervals is more or less similar except for < 1000 birr group, which accounted only 5.6 per cent. Some 71 per cent of respondents fall in a range of the income interval of 2000 birr and more. About 73 per cent of respondents have college diploma and below as far as education is concerned. Only 6.1 per cent of respondents have masters and above the educational level. As to employment more than half of respondents were self-employed. Government employment was also significant accounting 31.6 per cent of the total.

Table 1b. Head of Sample Households with Employment in Hawassa City 2013

Employing Organization		
Employer	**No. of Respondents**	**%**
Government	62	31.6
Non-government	16	8.2
Self	100	51.0
Other	18	9.2
Total	**196**	**100.0**

Source: *Based on Survey Conducted by the Authors in 2013*

Table 1c. Head of Sample Households with Income in Hawassa City 2013

Average Monthly Income in Birr		
Birr Interval	**No. of Respondents**	**%**
<=1000	11	5.6
1001-2000	44	22.4
2001-3000	53	27.0
3001-4000	38	19.4
>4000	50	25.5
Total	**196**	**100.0**

Source: *Based on Survey Conducted by the Authors in 2013*

Table 1d. Head of Sample Households with Education Level in Hawassa City 2013

Educational Level		
Level	**No. of Respondents**	**Per cent**
No education	14	7.1
Grades 1-8	41	20.9
Grades 9-12	48	24.5
Diploma	40	20.4
Bachelor	41	20.9
Masters and above	12	6.1
Total	196	100.0

Source: *Based on Survey Conducted by the Authors in 2013*

4. Trends in Walking and Bicycling:

Walking and the use of bicycles as a mode of transport was a norm in Hawassa city for many years in the near past. The situation has been changed recently so that walking and bicycling are steadily decreasing in actual terms, and this fact was confirmed by respondents from a household survey. Although significant numbers of old roads in the city were upgraded to asphalt level, there were no enough facilities for the use of non-motorized modes as indicated by responses regarding trends in walking and using bicycles for transportation and the sufficiency of pedestrian facilities in the city (Table 2). Pedestrian facility here is to denote all sorts of facilities that help for ease walking, which includes pedestrian crossings, walkways, properly covered ditches, separate lanes for bicycles, parking lots for bicycle owners, signs and signals and so on.

Table 2. Head of Sample Households Reporting About the Trend of Walking and Bicycling Facilities in Hawassa City 2013

Walking, Bicycling and Facilities as Reported						
	Increasing		Decreasing		Total	
Availability of Facilities	**No.**	**%**	**No.**	**%**	**No.**	**%**
Fully Available	9	20.0	34	22.5	43	**21.9**
Moderately Available	25	55.6	71	47.0	96	**49.0**
Scantly Available	9	20.0	45	29.8	54	**27.6**
Completely absent	2	4.4	1	0.7	3	**1.5**
Total	**45**	**100.0**	**151**	**100.0**	**196**	**100.0**

Source: *Based on Survey Conducted by the Authors in 2013*

Among respondents, 151 (77 per cent) of 196 said walking and the use of bicycles is decreasing in the city's

transport system. Of which some 30 per cent of them said pedestrian facilities were not sufficient. Only 20 per cent from increasing and about 23 per cent from decreasing group agreed with full sufficiency of pedestrian facilities. Residents who said walking, and bicycling was increasing were not different from those who said decreasing as far as impression about sufficiency of pedestrian facilities was concerned. Responses as moderately sufficient and not sufficient were 75.6 per cent from increasing group and 76.8 per cent from the decreasing group. As to separate lanes for bicycles, 93.3 per cent of respondents from increasing and 97.4 per cent from decreasing group said this facility was not existent in the city indicating a city transport plans was motorization biased. In aggregate only 3.6 per cent of the total respondents have chosen yes alternative for the presence of separate lanes for bicycles. Post modernist concept of city planning, which had been advocating smart and compact city growth, ecological approach to city planning, mixed land use, accommodative infra structural facility for non-motorized mode of transport was not partially or fully introduced in Hawassa city.

Without properly and effectively addressing the lack of inclusive road network designs for diverse modes of transport, including for pedestrians and cyclists, it would not be possible to create socially and environmentally friendly mobility. Not only, insufficiency of pedestrian facilities and separate lanes for bicycles in major motorized roads of Hawassa but the absence of parking lots for bicycles was also a serious problem to reverse existing motorization biased approach in the city transport system. Of total households 87.76 per cent reported absence of parking lots for bicyclists was serious and very serious issues. Owners of bicycles were not encouraged to use their bicycles for purposes other than offices, for instance, for shopping due to fear of thefts since they were not able to find the place to stay their bicycle parked. Besides lack of mixed land use and discouraged diversification of transport modes are responsible for presently isolated work places and homes. This situation was not pro-poor and contributed for inefficient and ineffective transport services in the city aggravating environmental problems.

5. Reasons for Decreased Walking and Bicycling

Important reason respondents given for the use of bicycles and walking were more of economic and due to distance decay. Accordingly, 18.4 did not choose at all for walking and bicycling. Among those who experienced walking and using bicycles low income (39.3 per cent) followed by short physical distance (23.5 per cent) were main reasons influenced them to use these modes both accounting for 62.8 per cent of the total (Table 3 and Figure 1). These results were expected because most writers found that walking and bicycling in developing countries was mainly for economic reasons in which case the poor were compelled to walk even some long distances because they neither could buy their own means nor afford for payable modes of public transport. The percentage share of presence of personal bicycle, sufficient time and other related factors was minimal. Unfortunately, presence of own bicycle was not even able to encourage the use of bicycle possibly because of absence of infrastructures for bicycles. It should be noted that low-income and short distances were reported as major factors for respondents to prefer walking and bicycling instead of motorized modes. However, increase in individual's income and increase in physical distance were reported as significant reasons for decrease in walking and bicycling by way of shifting individuals from walking and bicycling to the use of motorized modes of transportation (Table 6 and Figure 2).

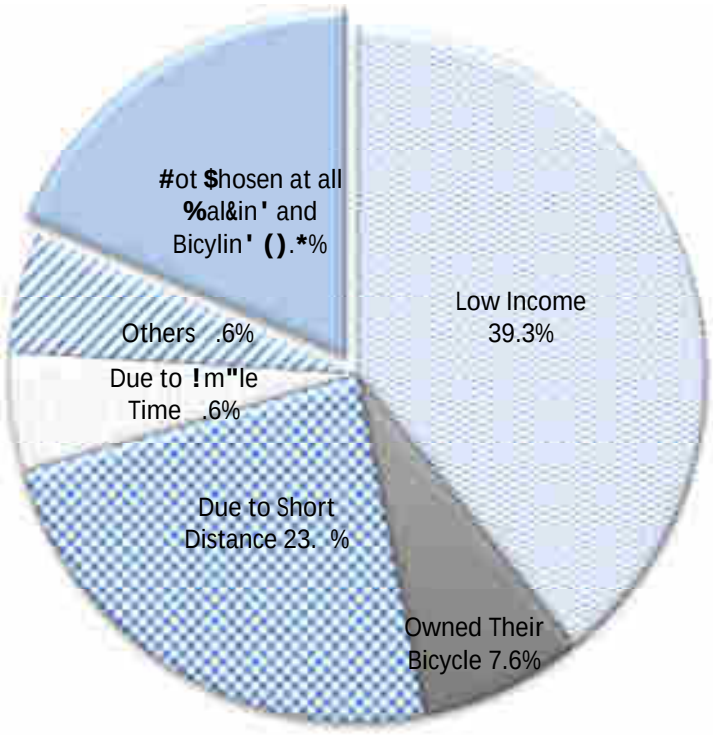
Table 3. Head of Sample Households Given Reasons of Walking and Bicycling as Their Mode of Transportation in Hawassa City, 2013

Reasons for Walking and Bicycling	No. of Respondents	%
Low Income	77	39.3
Owned Their Bicycle	15	7.6
Due to Short Distance	46	23.5
Due to Ample Time	11	5.6
Others	11	5.6
Total	160	81.6
Not Chosen at all for Walking and Bicycling	36	18.4
Total Sample	**196**	**100.00**

Source: *Based on Survey Conducted by the Authors in 2013*

Though income and short distance were main reasons to choose modes for household respondents (Table 4 and Figure 1), their impression about reasons for decreased walking and bicycling in the city was mainly because of introduction of bajaj (auto rickshaws/three wheelers) (30.1 per cent), increase in individual's income (21.94 per cent) and increase in physical distance of the city (13.78 per cent). These three reasons together accounted for about 65.82 per cent out of 196 respondents for those who indicated walking and bicycling as decreasing whereas 22.96 per cent of total respondents initially did not report walking and bicycling as decreasing (Table 4 and Figure 2).

Fig 1. Head of Sample Households given Reasons of Walking and Bicycling as Their Mode of Transport in Hawassa City, 201



3

Source: *Based on Table 3*

Table 4. Head of Sample Households Gave Reasons for Decrease in Walking and Bicycling in Hawassa City, 2013

Reasons for Walking and Bicycling	No.	%
Introduction of Bajaj	59	30.10
Increase in Income	43	21.94
Increase in Distance	27	3.78
Road Congestion	12	6.12
Social Rejection	10	5.10
Total	151	77.04
Reported Not Decreasing	45	22.96
Total Sample	196	100.00

Source: *Based on Survey Conducted by the Authors in 2013*

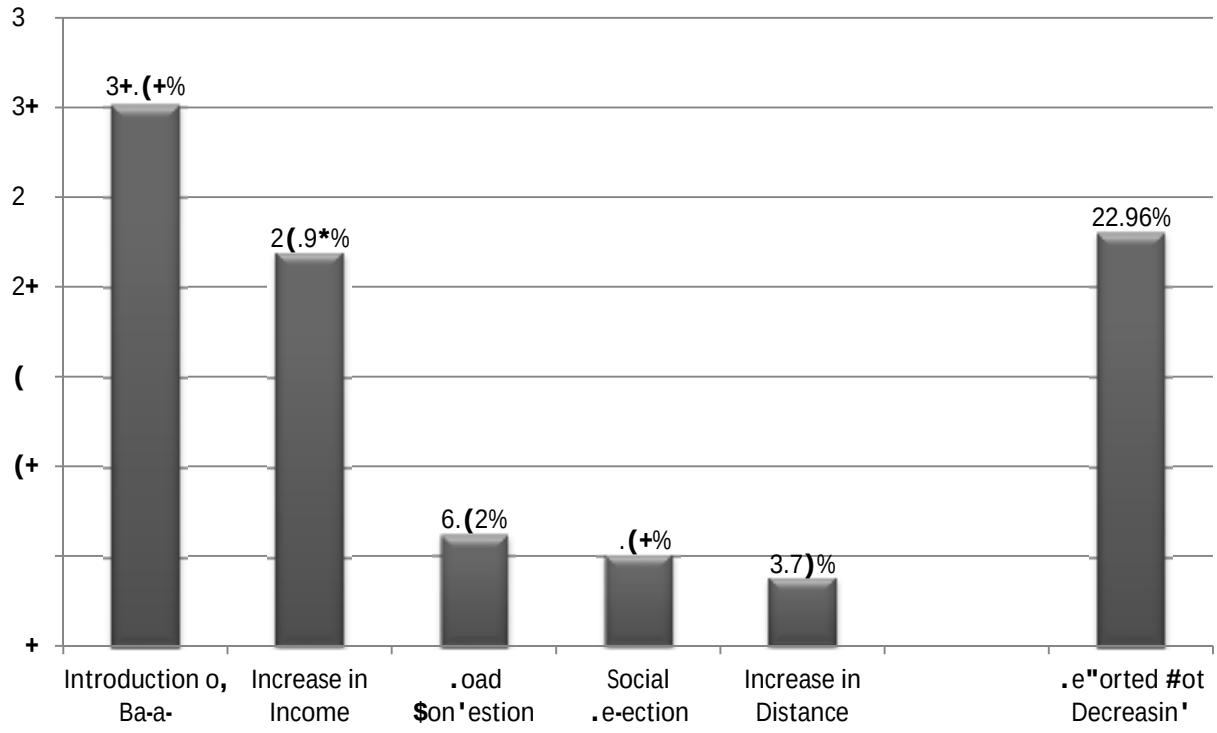
According to data gathered from Hawassa City Transport office (table 5) rapid growth in entrance of bajaj auto in the Hawassa transport system has become evident. The rate of change was so fast that in a year 2011 only 668 bajajs auto three wheelers entered into the city but within two years, these figures have risen for more than two times showing growth rate of 135.33 per cent between 2011 and 2012 then 42.49 per cent between 2012 and 2013 respectively. This confirms the introduction of bajaj auto three wheelers as the significant reason for transport users to shift from walking and bicycling to motorizated mode notably use of bajaj auto three wheelers.

Table 5. Growth of Bajaj Auto during 2011-2013 in Hawassa City

No.	Year	Number of Bajaj Auto 3 Wheelers	
		Number	Per cent
1	2011	668	….
2	2012	1572	135.33
3	2013	2240	42.49

Source: *Hawassa City Office of Transportation, 2014*

Fig. 2 Head of Sample Households Gave Reasons for Decrease in Walking and Bicycling in Hawasssa City, 2013



Source: *Based on Table 4*

We have seen that introduction of bajaj auto, increase in income and increase in physical distance accounted for 65.58 per cent of the total reasons (out of 196 respondents). This proportion has significantly changed (Table 6) when we compare the results among respondents who have chosen for motorized mode of transportation. The figures run as 30.1 per cent, 21.9 per cent and 13.8 per cent for introduction of bajaj auto three wheelers, increase in income and increase in physical distance respectively accounting for the total 65.8 per cent out of 151 respondents who were chosen for motorized mode of transportation.

Table 6 Head of Sample Households Gave Reasons of Using Motorized Mode of Transportation in Hawassa City, 2014

Reasons for Walking and Bicycling	No.	%
Increase in Income	43	21.9
Increase in Distance	27	13.8
Increase in Distance	12	6.1
Road Congestion	10	5.1
Introduction of Bajaj	59	30.1
Total	151	77.0
Reported Walking and Bicycling	45	23.0
Total Sample	**196**	**100.00**

Source: *Based on Survey Conducted by the Authors in 2013*

It can be noted that those who reported walking and bicycling account for 23 per cent of which none of them indicated the reason why non-motorized modes are favored whereas from a motorized group all have given their own reason (Table 6). Pearson Chi-square test was applied to test for independence of use of motorized mode of transportation and the reasons given by household respondents. The null hypothesis states that there is no longer a linear association between the use of motorized mode of transportation and the reasons given at 1 per cent level of significance The alternative hypothesis states that there is a additive relationship between these two variables at 1 per cent level of significance As shown in table 7 the two-sided asymptotic significance of the Chi-square statistic for these two variables was less than 1 per cent indicating relations were statistically significant. So that the null hypothesis that states the independence of these two variables was rejected at 1 per cent level of significance.

Table 7. Pearson Chi-Square Test Results for Independence of Motorized Mode Use and Reasons Given by Respondents in Hawassa City, 2013

Chi-square tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	196.000[a]	5	.000
Likelihood Ratio	211.203	5	.000
N of Valid Cases	196		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 2.30.

Source: *Based on Survey Conducted by the Authors in 2013*

Earlier, we have seen that most of the respondents agreed that walking and bicycling were decreasing in Hawassa city. We have also seen that walking and bicycling were major mode of transportation for 23 per cent of total respondents. However, all respondents agreed that walking and bicycling were a beneficiary in one way or another. The importance of walking and bicycling were reported for their benefits that included low cost/less expensive (29.1), health benefits (18.4), flexible routing (15.3) and easy management (11.2) respectively. These benefits accounted for 74 per cent of the total (Table 8).

Table 8. Responses of Head of Sample Households Using or Not Using Motorized Mode About the Importance of Walking and Bicycling in Hawassa City, 2013

Importance of Walking and Bicycling	Respondents with Modes of Transportation				Total	
	Walking and Bicycling		Using Motorized Mode			
	No.	%	No.	%	No.	%
Reported Not Important	3	6.7	42	27.8	45	23.0
Low cost	16	35.6	41	27.2	57	29.1
Easy management	8	17.8	14	9.3	22	11.2
Flexible routing	5	11.1	25	16.6	30	15.3
Health benefits	12	26.7	24	15.9	36	18.4
Minimized risks	1	2.2	2	1.3	3	1.5
Environmental benefits	0	0.0	2	1.3	2	1.0
Others	0	0.0	1	0.7	1	0.5
Total	**45**	**100.0**	**151**	**100.0**	**196**	**100.0**

Source: Based on Survey Conducted by the Authors in 2013

Very clear picture has emerged after evaluating the importance within walking and bicycling and using motorized groups separately. The aforementioned figures run as 35.6 per cent, 26.7 per cent, 11.1 per cent and 17.8 per cent for those who reported walking and bicycling and 27.2 per cent, 15.9 per cent, 16.6 per cent and 9.3 per cent for those who use motorized mode regarding low cost, health benefits, flexible routing and easy management respectively. Significant number of (27.8 per cent) those who were using motorized mode reported walking, and bicycling were not important but from those who reported walking and bicycling, only 6.7 per cent reported walking and bicycling were not important. This has taken as a good indicator to judge in the way that most of the respondents using motorized mode have already been withdrawn themselves from using feet and bicycles as a transport mode. Number of respondents who have mentioned minimized risks, and environmental benefits were insignificant in all cases accounting only less than 3 per cent of the total. This result was embarrassing because, as we have discussed earlier, half a million deaths were reported every year due to traffic accidents from motorization, and environmental issue have already become a global concern. This calls for a need for strong works to aware communities regarding effects of motorization and associated benefits of walking and bicycling as a mode of transportation.

Table 9. Pearson Chi-Square Test Results for Independence of Mode of Transportation and Importance Given by Respondents in Hawassa City, 2014

Chi-Square Tests			
Chi-Square Tests	**Value**	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	13.768[a]	7	.055
Likelihood Ratio	15.964	7	.025
N of Valid Cases	196		

a. 6 cells (37.5%) have expected count less than 5. The minimum expected count is .23.

Source: *Computed from Author's Own Survey, 2014*

Association between a mode of transportation and respondent's reply as to apparent benefits of walking and bicycling was tested using Pearson Chi-square test. The null hypothesis states that there is no relation between a mode of transportation and benefits mentioned by respondents. The alternative hypothesis states that these two

variables are related, and the relationship is statistically significant at 10 per cent level of significance. The Chi-square statistic shown in table 9 for these variables is 5.5 per cent, which is less than 10 per cent.. Therefore, we rejected the null hypothesis at 10 per cent level of significance. This proved multiple benefits from the use feet and bicycles as a mode of transportation. Therefore, walking and bicycling as a transport mode should be strengthened because they were proved to be efficient particularly for small emerging cities like Hawassa with no negative environmental effects, and with little individual risks compared to motorized modes of transportation. Intensified use of feet and bicycles plays a role of diversifying existing transport system. It also minimizes inefficiencies in the existing transportation system of the city. Hawassa needs harmonized transportation with environment, which can be realized partly by way of providing balanced infrastructure between motorized and non-motorized transport. Besides restrictions on motorized transport modes should be posed around environmentally sensitive localities such as lake side (to prevent water pollutions) and public places such as green corridor around Amora Gedel recreation center along Lake Hawassa. By doing so, it would be possible to prevent negative effects from motorization, which may include noise pollutions, congestions, and gas emissions, that endanger lake ecology, including risk against fish lives from ongoing motorized mode of transport.

6. Conclusion and Suggestion

Walking and bicycling as a mode of transportations were among the earliest modes in human history both for passengers and freights. Motorization has invented as a result of development in the transportation system which in turn resulted in reduced use of non-motorization. Further development and increase in the motorized system negatively influenced the use of non-motorized modes so that non-motorized modes of transportation are on their ways to be replaced. Development in transportation infrastructures and services largely contributed for human being's advancement and dramatically reduced the effect of physical distances bringing distant places closer to each other. However, these merits of motorizations were not without negative effects. Motorized transport was one of the responsible factors for deaths of many and for the prevailing degraded natural environment at world scale.

Hawassa as one of the emerging secondary cities in Ethiopia, has been enjoying walking and bicycling as mode of transport for years. However current situation of Hawassa has been changed and as a result walking, and the use of bicycling have been steadily decreasing. Results from the household survey have shown that absence and insufficiently operating facilities for non-motorized modes have discouraged the use of these modes. Lack of infrastructure, for instance, absence of pedestrian crossings, lanes and parking lots for bicycles were affecting the use of these modes. Certain respondents reported walking and bicycling as their mode of preferences due to low-cost and manageable physical distance. Respondents answer for why walking and bicycling were decreasing was mainly because of introduction of Bajaj auto. Improved income was among reasons reported, which played a role of facilitation to buy own motorized means and to pay the charges for motorized modes of transportation. The test result has shown that there was an association between the use of motorized mode of transportation and the reasons given by respondents. The test result has also shown there was a linear association between a mode of transportation and importance of the use of non-motorized modes as reported by respondents.

Despite these benefits, reviews have shown the abscesses of a clear strategy to encourage the use of non-motorized modes of transportation in the city. This calls for a fast response from government side. Policy environment for non-motorization is important as experiences from other countries have shown. Accommodative design for pedestrians and cyclists should be parceled of policy components to strengthen walking and bicycling. Government should encourage the use of walking and bicycling as a transportation mode by way of providing infrastructures and by designing regulatory tools to protect effects of motorization. For instance, banning motorization around environmentally sensitive areas such as lake side, public squares, etc. should be effected soon. The policy components should also consider the mixed use of both motorized and non-motorized modes of transportation. By doing so diverse transport system will be created, which adds efficiency and effectiveness in the existing system.

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