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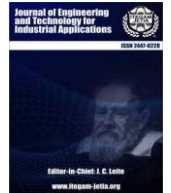
IDENTIFYING THE CHALLENGES TO SUSTAINABLE HIGHER EDUCATIONAL INSTITUTIONS COMMUTE

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ARTICLE INFO	ABSTRACT
	The first objective was to understand commuters' regular travel mode. The second objective was to understand the reasons for the regular mode and the preferred alternative when this regular mode was not available. The third was to determine the willingness to change to public transport mode and what concerns commuters had about the mode. A questionnaire survey of workers who commuted daily to Higher Educational Institution (HEI) workplaces located at the city of Ado Ekiti was conducted. This survey collected data on respondents' regular commute mode, alternative commute mode, willingness to use public transport mode and the desired improvement in public transport mode. Commuters' most popular commute mode was private automobile with 67% using this mode regularly. This was followed by a variant of carpooling called joining others (19.4%) and then public transport (13%). The most preferred alternative for all commuters was joining others which 49.6% opted for. The willingness to use public transport was found to be 66.5% with improved public transport vehicles and better driver training identified as necessary for improved uptake of public transport. This paper concludes that the choice of respondents generally underscored the need to improve public transport system as well as encourage its acceptability and use.

I. INTRODUCTION

Higher educational institutions (HEIs) throughout the world are striving to create sustainable campuses with transportation regarded as one area that can play a significant role [1, 2]. This is more so as commuting is said to be the largest single impact such places have on their environment [3]. The HEI environment is usually composed of medium to high income earners who can afford automobiles and use the same to commute. Automobile dependence however contributes to environmental pollution, traffic congestion, traffic crashes and other social problems. It is also largely responsible for physical inactivity. Automobile dependence is thus described as being detrimental to both physical health and the environment [4] and requires appropriate management measures, usually transportation demand management (TDM), to mitigate its impacts. Such TDMs include campus transit services, parking policies and other strategies such staggering work/class times, telecommuting to work/class, provision of more housing units within or near campus [5,6].

In many instances, nevertheless, particularly in developing countries, many benefits of appropriate management of the transport demand in HEIs are overlooked. This is particularly with respect to improving the adoption of active commuting. Support for active commuting (non-motorised and public transport) can benefit the local environment as they lead to reduction in congestion and air pollution, while at the same time improving public health. This is more so in HEI settings where campus and off-campus housing are separated by only short distances and amenities and stores are concentrated within a short distance from campus. Similarly, the adoption of active commute modes increases physical activity, leading to increased academic performance and reduction in cases of depression [1]. Furthermore, as pointed out by [7], an HEI is a miniature of the larger society where values and behaviours are formed and therefore have the capacity to influence the larger society.

There have therefore been a lot of work on HEI commuting mode choice decision [1,8,9]. [1] showed that travel time was mostly responsible for the choice of commute mode. They also noted that improving bus service as well as the provision of more

housing units close to HEIs can support modal shifts. [9], in their study, found that auto ownership had the greatest influence on mode choice. [8] found, amidst others, that the availability of sidewalk was significantly associated with how attractive non-motorised transportation was. Understanding the modal choice of members of the HEI community and the influencing factors for the choices can therefore be useful in creating a sustainable campus.

This study seeks to identify the nature of commute mode choice of two HEIs in Ado Ekiti, Nigeria, a developing country setting. Ado Ekiti is the administrative head of Ekiti State, one of the 36 states in Nigeria, a status it acquired in 1996. This status propelled a rapid growth in both social and economic activities with increase in income levels, job availability, vehicle ownership as well as the number of commute trips. While the status offered increased availability of fund for development, including highway development, this is not able to meet up with the rapid growth in vehicle ownership. As pointed out by [10] this situation did not only hinder free flow of traffic, but also led to parking problems, noise and air pollution and increased traffic accidents. Specifically, a study reported that as much as 20minutes was spent to traverse a distance of 500meters during peak period [11]. The contributions of the HEIs to this situation may be much. In addition, many HEI related commute trips experience these problems regularly. A good understanding of the modal choice decision process of HEI commuters may not only improve the traffic but can also reduce the exposure of these commuters to the problems. This is as such understanding can be helpful in developing strategies that can improve the uptake of active mode for commuting. The objectives of the study are therefore to determine: (i) the regular commute mode of workers in the two HEIs; (ii) the reason for their commute choices; (iii) the preferred alternative where the current choice is not available; (iv) the reason for the choice of the alternative; and (v) their willingness to use public transport mode. The rest of the paper describes the methodology in section 2 and the results and discussion in section 3. Section 4 provides a brief conclusion.

II. METHOD

To evaluate the choices of commuters and the basis for their preferences, data was collected from workers of two HEIs in Ado Ekiti, Nigeria via survey questionnaires. These HEIs are located at the city outskirt. To meet the objectives of the study, it was essential for the survey to collect data relating to respondents' regular commute mode, alternative commute mode, willingness to change to public transport, and respondents' socio-economic details.

Once the survey had been designed, the registry departments of the two workplaces were contacted to obtain the population of workers in the workplaces. This information was used to estimate the number of survey instruments that would be produced. Four hundred and fifty copies of the survey instrument were eventually produced to cover 10% of the workforce. .Individual departments were then contacted and the questionnaires were distributed directly to willing members of staff in the two workplaces in line with extant research ethics. The questionnaire contained information about the background and purpose of the survey. All procedures were performed in compliance with relevant laws: informed consent was also obtained from each of the respondents. The circulation and collection of the questionnaires took place between April 10 and April 20, 2019. At the end of the survey, a total of 379 responses were recovered.

III. SURVEY RESULTS AND DISCUSSION

III.1 PERSONAL CHARACTERISTICS

Table 1 shows personal characteristics of respondents. A plot of the age of respondents would reveal normal distribution. The lowest age bracket is poorly represented in the survey. The highest proportion of participants is between 40 and 49 years of age (44%).

In addition, the gender of the participants is split reasonably evenly, with 53% female and 47% male. Lastly, the income, based on age, shows the highest age group of 50 and above earning the most. This shows an increase in income with age. This is usual as workers increase in age and earn more as they stay longer on the job.

Table 1: Respondents' characteristics.

	Frequency	Valid Percent
Age		
20-29	7	1.9
30-39	108	28.8
40-49	165	44.0
50 and above	95	25.3
Total	375	100.0
Non Response	4	
Total	379	100.0
Gender		
Male	178	47.0
Female	201	53.0
Total	379	100.0
Income by age group		
20-29	5	45800.00
30-39	56	50480.36
40-49	109	76354.43
50 and above	82	112347.79
Non Response	123	
Total	379	100.0

Source: Author, (2021).

III.2 MODE OF TRANSPORT USED

Table 2 shows the modes of transport used by respondents for trips to work on a regular basis. The major travel modes used by commuters were driving, public transport and joining others. About 67.1% drove to work while 13% used public transport. Public transport vehicles in use were public buses (mini-buses), and hired and public taxis. Hired and public taxis were passenger cars used within the city for shared taxi services: because of their low capacity, they would not normally operate on routes which were far from city centre. With the workplaces considered being at the city outskirt, the two were less frequently used than the public buses. Finally, about 19.4% joined other vehicle owners to work. Joining others is a form of carpooling where car owners pick up colleagues on their way to/from work.

Table 2: Regular means of transportation of respondentes.

	Frequency	Percent	Valid Percent
Driving self	253	66.8	67.1
Public Transport (Public Bus, Hired Taxi and Public Taxi)	49	12.9	13
Joining other staff	73	19.3	19.4
Others	2	.5	.5
Total	377	99.5	100.0
Non Response	2	.5	
Total	**379**	**100.0**	

Source: Author, (2021).

III.3 REASONS FOR THE REGULAR MODE

Table 3 shows the outcome of responses on respondents' reasons for their choice of regular commute mode. When respondents were asked why they used their regular mode of commute, 35% pointed out that it was because they owned a car. This reason does not indicate that these group had a necessity for driving to work, though they might have. Since they had cars, they used it as they desired and also for commute trips. This might be an indication that there were no policy measures in place to encourage car owners to adopt sustainable travel modes. Measures that discourage car owners from commuting by car may be able to reduce the group of people in this category. On the other hand, 30.9% indicated that it was more convenient for them. These group were obviously car owners who considered car use as convenient probably due to limited access to public transport or the demands of child care, or any other reasons. Nevertheless 2.6% of respondents indicated that the cost of fuel was the basis for their choice of commute mode. These group most likely had a car but were not using car for commute trips due to the cost of fuel. Another reason given by respondents for their choice of current commute mode was access to free transport. These group must be respondents who joined others. Access to free transport for commute trips may be able to reduce the number of commuters by car. Free public transport had been used in some places to reduce car trips and improve traffic. Others were "I don't own a car" (14.5%), "I can't drive a long distance" (2.1%), and (high) car maintenance cost (7.1%). Those who used their current commute mode because they did not own a car were potential commuters by car as they considered their current choice as due to lack of a car. It would be expected that this group might eventually add to those who commuted by driving when their economy improved. Except

there are measures to discourage car use, it may be possible that the percentage of commuters by car would increase as people's economy improved. For those who regarded car maintenance cost as a challenge to commuting by car, it is possible that they were mostly low income staff. Providing safe and convenient alternative for this group might keep them perpetually away from contemplating to commute by car. This also applies to those who indicated that they could not drive a long distance. A good public transport system would make them enjoy their commute mode without attempting to switch to car use.

It should be noted that no respondent gave any reason in favour of public transport. Generally, public transport in developing countries are poorly regulated and mostly poorly operated. Thus, it would not readily attract patrons in most instances.

Table 3: Reason for choice of regular travel mode of transportation of respondentes.

	Frequency	Percent
Access to free transport	28	7.4
I own a car	133	35.1
Fuel	10	2.6
Convenience	117	30.9
I don't own a car	55	14.5
I can't drive long distance	8	2.1
Car maintenance	27	7.1
Others	1	.3
Total	**379**	**100.0**

Source: Author, (2021).

III.4 PREFERRED ALTERNATIVE WHEN THIS REGULAR MODE WAS NOT AVAILABLE

Furthermore, respondents were asked to indicate their alternative commute mode if they had to change their current commute mode. The outcome is shown in table 4. About 14% indicated that driving would be their alternative commute mode. This proportion shows a huge difference between those who drove currently and those who would have to drive as their preferred alternative mode. This is also a pointer to the possibility that a larger proportion of respondents driving to work did not need to and might change their commute mode if appropriate policy measures were introduced that made considering alternative commute mode necessary. Similarly, As much as 25.3% indicated that public transport would be their alternative mode. Again, this is a pointer to the potential for improved adoption of public transport from 13% (table 2/section 4.2) to 35.6% (the sum of public transport, hired taxi and public taxi) if appropriate measures were put in place. The highest percentage of respondents at 49.5% opted for joining others as their alternative commute mode. This high proportion indicates that joining others, a form of carpooling, had potentials for a huge success with high adoption rate if properly implemented. Nevertheless, under the current condition, this proportion is much higher than the proportion of those who would adopt public transport and more than three time the share of respondents who would drive to work as their alternative commute mode. Joining others implies that there would be someone driving who would be willing to share the car. With the percentage of respondents driving being less than a third of respondents who would be willing to join others, it might be difficult to satisfy this group by those driving. This would likely result in some of respondents in this group switching over to other modes, especially, driving. These findings show that preference for private

car use may remain high if nothing is done to support or promote other modes, especially the more sustainable ones.

Table 4: Alternative to get to work.

	Frequency	Percent	Valid Percent
Driving self	52	13.7	14.0
Public bus	94	24.8	25.3
Hired taxi	21	5.5	5.7
Public taxi	17	4.5	4.6
Joining other staff	184	48.5	49.6
Others	3	.8	.8
Total	371	97.9	100.0
Non Response	8	2.1	
Total	**379**	**100.0**	

Source: Author, (2021).

III.5 PREFERRED ALTERNATIVE WHEN THIS REGULAR MODE WAS NOT AVAILABLE

Having considered respondents' alternative commute modes, it was necessary to find out the reasons for the choice of the alternatives they made. The result in table 5 shows that *convenience* was the most valued reason for the choices respondents made, being the reason 60% of respondents gave. This is followed by *accessibility* at 14.2% and *cost* at 9.9%. Other reasons had lower considerations being *time saving*, 5.2%, *residence location*, 4.9%, and *no alternative*, 3.4%. This points to the value placed on convenience by commuters. Whatever commute plans that may be contemplated for implementation by policy makers would therefore need to understand the characteristics of patrons and what convenience is to them if such plans would be successful.

Table 5: Reason for Alternative chosen.

	Frequency	Percent	Valid Percent
Accessible	46	12.1	14.2
Cheap	32	8.4	9.9
Convenience	195	51.5	60.2
Faulty car	3	.8	.9
Neighbourhood	16	4.2	4.9
No Alternative	11	2.9	3.4
Safety	4	1.1	1.2
Time saving	17	4.5	5.2
Total	324	85.5	100.0
Non Response	55	14.5	
Total	**379**	**100.0**	

Source: Author, (2021).

III.6 WILLINGNESS TO CHANGE TO PUBLIC TRANSPORT MODE

In addition, respondents were asked to indicate whether they would be willing to use public transport mode for their commute trips and what changes/improvement to public transport mode would enhance this decision. As shown in table 6, 66.5% of respondents indicated that they would be willing to use to public transport while only 33.5% were not willing. It had been shown earlier that 60% of respondents valued their comfort/convenience and this was their reason for choosing the modes they adopted. This implies that a certain percentage of respondents which would be more than 25% (being the difference between respondents (60%) who valued convenience and those who would not use public transport (33.5%) if it was assumed that their reason was largely due to convenience) believed that the convenience they desired for

their commute trips could be provided by public transport mode when improved. The potential for a more sustainable travel is therefore high especially with the use of public transport and other more efficient modes if these are properly implemented.

Table 6: Willingness to go to work using public transport.

	Frequency	Percent	Valid Percent
Yes	250	66.0	66.5
No	126	33.2	33.5
Total	376	99.2	100.0
Non Response	3	.8	
Total	**379**	**100.0**	

Source: Author, (2021).

III.7 WHAT CONCERNS COMMUTERS HAD ABOUT PUBLIC TRANSPORT

Furthermore, respondents indicated the nature of improvement they desired in public transport to become more appealing to them. Three major issues were most important to the respondents. These were: improved quality of the roadway, being 44.8%, improved quality of public transport vehicles, being 30.2%, and improved driver training for public transport drivers, being 15.6%. These were ahead of other themes such as reduction in the cost of public transport, being 6.2%, provision of good terminals/bus stops, 2.3% and reduction in stop dwell time, being 1%. It must be noted that the same roadways were used by both public transport and other travel modes. The attachment of improved quality of roadway to the adoption of public transport mode might just be a concern about the poor condition of the roads at the time of the survey. Nevertheless, travelling in private automobile on bad roads might be more comfortable for vehicle occupants than travelling along the same road in poorly maintained public transport vehicles. This is more so as improved public transport vehicles was the second most important improvement desired in public transport operation.

In addition, drivers' training also had high importance attached to it. Public transport drivers were generally rough, impolite, and often engaged in high risk behaviours which usually discouraged patrons who had alternatives. It is therefore important that drivers' training for public transport operation is given attention to improve commuters' experience when using this public transport mode.

Table 7: Improvement needed to make public transport acceptable.

	Frequency	Percent	Valid Percent
Creation of bus terminals	7	1.8	2.3
Good bus/car	93	24.5	30.2
Motorable Road	138	36.4	44.8
Reduced cost	19	5.0	6.2
Reduced loading time	3	.8	1.0
Training for drivers	48	12.7	15.6
Total	308	81.3	100.0
Non Response	71	18.7	
Total	**379**	**100.0**	

Source: Author, (2021).

IV. CONCLUSIONS

In this paper, it has been shown that substantial percentage of commuters in the two HEIs considered commute by self driving. Commuting is most responsible for peak hour trips and therefore contributes significantly to congestion and air pollution, amidst other issues [6] The fact that about 67.3% drive self to work as found in this study suggests that the problem of congestion and air pollution can be substantially reduced with fewer people self-driving, considering the population of workers involved. The challenge of moving commuters from their current mode to a more sustainable mode nevertheless needs to note the basis for the choice of their current mode. It is important to note that auto ownership is the most important reason for the current mode. Re-orientation and the creation of awareness on the benefits of sustainable modes are needed to reduce the number in this category. But this is not possible without considering the convenience of available sustainable options. This is more so as convenience is second to ownership as the reason for the choice of the current mode. Generally, public transport system is poorly operated in many developing country settings and would be difficult to move commuters from automobile to it. Aoun et al (2013) however noted that innovating new services that cater for the need (especially convenience) of campus members may be better than merely promoting available conventional public transport service. Where this is done, a public transport system may do better than it does currently. This is more so as about 66.5% admitted that they would change to public transport if the system is improved.

Finally, when workers were asked what alternative mode would be considered if their current mode was not available, about half (48.5%) selected "joining others". "Joining others" is a form of carpooling which is well promoted in many developed country settings. The promises offered by carpooling may be exploited when the HEI transport unit in conjunction with local authority provide appropriate policy support for the mode. Similarly, Aoun et al., (2013) suggested a variant they described as a dynamic taxi-sharing service. This service which is an improvement upon taxis combines the higher vehicle occupancy of a shared taxi with the reliability and comfort of a private taxi. They pointed out that this can come at the reduced cost of a public transport fare and still meets the high-income users' preference for cars over buses. The market for this variant is, however, a subject of another research.

This study did not compare characteristics across different commute modes. This is due to the limitation in the amount of data available for analysis. Future work will require collecting more data and comparing characteristics across various modes.

V. AUTHOR'S CONTRIBUTION

Conceptualization: Oluwasegun Oluyemi Aluko.
Methodology: Oluwasegun Oluyemi Aluko.
Investigation: Oluwasegun Oluyemi Aluko.
Discussion of results: Oluwasegun Oluyemi Aluko.
Writing – Original Draft: Oluwasegun Oluyemi Aluko.
Writing – Review and Editing: Oluwasegun Oluyemi Aluko.
Resources: Oluwasegun Oluyemi Aluko.
Supervision: Oluwasegun Oluyemi Aluko.
Approval of the final text: Oluwasegun Oluyemi Aluko.

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