

# «The impact of human factors on the trade-off behaviour between common transport and the private car- the case study of Algiers.»

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**Abstract**— The study aims to investigate the policies that would lead to a behaviour change for a sustainable mobility, and how the aspects of ergonomics and human factors can affect the trade-off behaviour between the available means of transport in Algiers .The study was based on tow research methods, a qualitative followed by aquantitative research.The Qualitative research has explored the current plan of transport in the agglomeration of Algiers and has investigated the trend of car ownership from2003to 2016 highlighting its socio-economic impacts. The key finding in this study has been the divergence in the behaviour ofcommuters, the study has therefore concluded that although significantchanges occurred in their travel behaviour with the implementation of newmeans of transport such as the tramway and the metro rather than the bluebuses (public ones), there is still important factors to be considered, and policiesto be developed; which would provide the basic requirements and comfort parameters of passengers without neglecting the environmental, social and economic aspects of sustainable transport services.

**Keywords**— urban transport, travel behaviour, mode choice, human factors, sustainable transport.

## I. INTRODUCTION

Transport is a vital faction in the sector of services; from one hand, it contributes to the motivation of urban life in all its aspects, and from the other hand, it can be a crucial factor of sustainable development for modern societies. It also ensures the mobility of people and freights to the areas of activity and services.

Human mobility is as important as the mobility of freights and perhaps even more important, because the process of production and distribution of goods would not happen without human's intervention. Add to that, its direct relation to the safety and the welfare of individuals.

Each individual Uses one or more means of transport available in his daily trips of outing, shopping and home-work or home-study trips ...etc, and certainly a trade-off behaviour would occur at the moment of a travel decision; However many factors including human factors may affect this decision, and lead to a choice that might be either in the favour to sustainable development or not.

In other words, in this context, the stakes in terms of sustainable development are daunting; because, faced with this desire to develop an electro-mobility based on public transport (through the tramway projects in particular) there are challenges in terms of using cars running on abundant and cheap fossil fuels. In these particular economic aspects favouring the use of personal cars instead of common transport in Algeria, there are other factors that would strengthen this trend.

**So what are these factors and what are their impacts on the trade-off behaviour between common transport and the private car in the agglomeration of Algiers?**

In order to better explain the different aspects of our problematic and the constraints discussed above, we have treated the following hypothesis:

➤ Personal factors have a statistically significant relationship with the behaviour of trade-off between the private car and common transportation.

➤ Algerian commuters are not ready to give up the use of personal cars in their urban trips in favour of common transport;

## II. METHODOLOGY:

The study was based on two research methods, a qualitative followed by quantitative research.

The Qualitative research has explored the current plan of transport in the agglomeration of Algiers and has investigated the trend of car ownership from 2003 to 2011 highlighting its socio-economic impacts.

However a questionnaire survey was spread over a thousand of people (including people with disabilities) who benefit from transport services focusing on private car users versus users of bus aiming to examine their travel behaviour and probe the principle factors that affect their preferences and attitudes toward different means of transport including the private car.

Different tools including Microsoft-Excel, the statistical package SPSS, and Stat-Excel were employed in the analysis of the questionnaire data.

## III. THEORETICAL BACKGROUND:

The literature study deals with theories of how people choose their mode of travel and focus on the differences between psychological and economic theory, and qualitative and quantitative methods. It concludes with a review of methods based on utility maximization.

### 4.1. The Theory of Reasoned Action:

According to the theory of reasoned action, the intention of a person is a function of two basic determinants; personal and social.

“The personal factor is the individual’s positive or negative evaluation of performing the behaviour; this factor is termed attitude toward the behaviour” (Ajzen, 1985; Ajzen&Fishbein, 1980). In other words the personal factor represents the way the individual perceives the behaviour and not the surrounding environment i.e. objects, people or institutions...

“The second determinant is the person’s perception of the social pressures put on him to perform the behaviour in question. And this factor is termed *subjective norm*”. (Ajzen, 1985; Ajzen&Fishbein, 1980).

### 4.2. The Theory of Planned Behaviour:

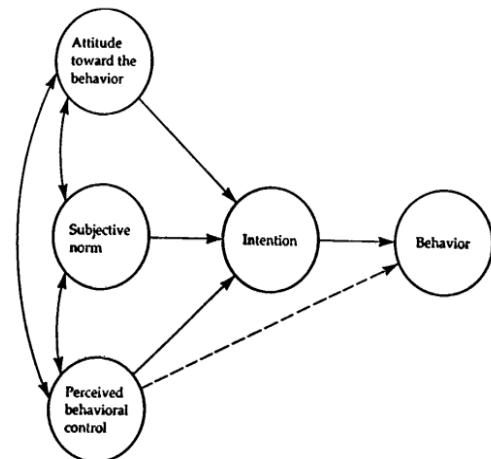
After the theory of reasoned action, (Ajzen, 1985) developed the so called Theory of planned Behaviour that includes the variable of perceived behavioural control. This theory, the Theory of Planned Behaviour (TPB), assumes that the choice is also dependent on the individual’s perception of his or her ability to execute certain behaviours (Ajzen, 1985). TPB has made it possible to explain the choice of travel mode (Forward 1998a, Forward 1998b).

According to TPB, the person acts rationally and his/her decisions are considered consciously and the intention behind certain behaviour depends on the following factors:

- The attitude toward the behaviour;
- The social norm ;

- The perceived behavioural control.

Fig.1 The Theory of Planned Behaviour



Source: Icek ajzen: *The Theory of Planned Behavior. Organizational behavior and human decision processes*, Ed.50, pp 179-211 University of Massachusetts at Amherst (1991) P 182.

The demonstrated in Figure1, TBP shows that it is possible to change a person’s behaviour by influencing his attitudes, the subjective norm and his perceived behavioural control. If we want more people to travel by public transport, we can influence their attitudes, for example by offering free test trips, which may give them personal experience. The subjective norm can be influenced by good examples such as celebrities and politicians showing them using train and public transport in their daily trips. However Perceived behavioural control which is a function of control convictions, arises partly out of one’s own experiences and partly indirectly, as a consequence of information given by other people for example how difficult someone believes it is to travel by train. (Lindström Olsson, 2003).

### 4.3. The (TPB) with “habit” variable

Concerning means of transport, “the variable **habit** represents a very important factor in the explanation of the commuting behaviours. By extending the variant of TPB Forward (1998b) added the factor habit to the model” (Lindström Olsson, 2003)

Findings of different studies made in four different cities confirmed that perceived control and habit have a high degree of explanation for travel mode choice and a strong linkages between intention and behaviour. The results show that the discussed

variables help to explain the travel mode choice by between 42 and 69% of the intention to walk, cycle and drive short distances.

### 4.4. The Theory of Utility Maximization:

A random utility maximizing random choice function assigns probabilities to outcomes as if the decision maker randomly “chooses” a strict utility function and then picks from each option set the maximal element

Let us consider that an individual, at a particular point in the day is to choose an activity to perform and corresponding time expenditure or duration,  $t_j$ . We can assume that a rational individual will maximize her utility in choosing the activity type to schedule and the total time expenditure on it. In expending time for the chosen activity, however, the individual faces a time budget limitation. This time budget limitation is not constant throughout the day. The day begins with a 24-h time budget limitation which is gradually reduced with the number of activities performed over the course of the day in different locations. The remaining time budget at any point of scheduling an activity is the left over time after all previously performed activities have been completed. While executing an activity, i.e., defining the duration of a specific activity, the individual trades off between time expenditure to the chosen activity and travel time required to reach the activity location versus total time left over for all other activities to be completed in the balance of the day. As we do not know for certain the causes and factors that influence the individual's trade-offs in choosing alternative activity types and time expenditures out of a limited time budget, it is reasonable to consider the assumption that the utility associated with activity type and time expenditure includes random elements.

Hence, the utility maximizing approach to model activity type choice and time expenditure choice is really a Random Utility Maximizing (RUM) approach. Addressing the facts that the time budget decreases as the day progresses and that the scheduling of any particular activity type is affected by what activities the individual already completed in a given day means that the method captures some (though not all) of the behavioural dynamics of the activity scheduling process. In the context of such a situation the choice of a given activity type at any point in time influences expenditures of the limited amount of time from the left over time budget, and vice versa.

#### 4.5. The Random Regret-Minimization model of travel choice

The Random Regret-Minimization model is rooted in Regret Theory and provides several useful features for travel demand analysis. Firstly, it allows for the possibility that choices between travel alternatives may be driven by the avoidance of negative emotions, rather than the maximization of some form of payoff. Secondly, it acknowledges that traveller decision-making in the context of multi-attribute alternatives may not be fully compensatory (Caspar G. Chorus, et al, 2008).

Caspar G. represents in the estimable Random Regret-Minimization model of travel choice as an alternative to mainstream Random Utility-Maximization models. Asserting that when making travel choices, people tend to anticipate and avoid the possibility that a non-chosen alternative performs better than the chosen one. This avoidance of anticipated regret, rather than the maximization of utility, is assumed to be specifically relevant in traveller behaviour.

The theory shows how regret-minimization may lead to different choice outcomes in both riskless and risky choice situations: in short, regret-minimization favours alternatives that perform reasonably well on each attribute, whereas utility-maximization

favours those that perform particularly well on the most important attribute (Caspar G. Chorus, et al, 2008)..

#### IV. THE EMPIRICAL STUDY:

The Improvement of the living standards the recent years has had a direct impact on the growth of motorization rate. As shown in the figure below, the increase in car ownership was rather light and progressive over the period 1990-2000. However in 2001, the rate showed a significant increase. It has almost doubled over the period 2001-2008. This net increase is due to the development and economic growth observed over the past decade. In this favourable context, car dealerships have blossomed and sales have been boosted by the car loan. Algerians were quickly equipped cars. Note that the process of buying on credit has been frozen in 2009 and the introduction of a new tax on the purchase of new cars imported. These new arrangements have been made for several reasons:

- It has been noticed that many families could not pay the bills;
- From a political point of view, it is more interesting to encourage mortgage as car loans;
- There was still a good tax base for a new tax that may contribute to the fund to support public transport;
- Algeria was importing cars, perhaps should think of forms of incentives towards the manufacturers to invest locally;
- And finally, the transmission began to no longer absorb the surplus of vehicles and congestion problems became increasingly important.

##### A. Data analyses:

In terms of mode choice and the trade-off between public transport and private car, we headed a survey in the city of Algiers.

The survey was conducted in the period of December 2011 and January 2012. It is important to mention that the survey was administered two months after the inauguration of the metro line (9.5 km) and seven months after the opening of the first tramway line (7.5 km), so the results has been certainly influenced by the commissioning of these modern means of transportation; however experience was still recent and did not allow to highlight structural changes and/or new habits. That said, the first results of the survey still confirm a general trend of certain hypotheses that we have issued.

We have selected 1009 questionnaires from 1100. The rest has been rejected for reliability reasons.

##### B. The factors that influence the trade-off behaviour between the car and the common transport in the city of Algiers:

we have selected eight factors to study the characteristics of the sample and these factors are:- the sex, the age, the Educational level, the Income, the function or profession the marital status the residence location and health (the disability status for the handicapped), and according to the theory of planned behaviour these are very important human factors that may influence the trade-off behaviour between the car and the common transport, according to the theory cited in the study of Q. Ajzen 1985 and forward 1996.

1. Sex :

The distribution of the sex factor in the sample of the study is presented in the following table

Table 01 The distribution of the sex categories of the sample

		N	%
Sex	Men	536	53,1
	women	473	46,9
	Total	1009	100,0

It is seen from the table 01 above that the sex of the sample interviewed is distributed almost close, where the male category occupies 53.1% which is the mean of this category, while the female category is estimated to 46.9% .

This distribution converged between the two categories of male and female sample reflects the reality of the community especially the active and working one, the percentage of female participation in various aspects of life in the community knows a remarkable growing rate, especially in the field of education, health, and various fields of business...

### 1. Age:

For the age different categories results were as follow:

Table 02 the distribution of The age categories of the sample

		N	%
Age	Less than 20 years	102	10,1
	20 to 40 years	783	77,6
	40 to 60 years	105	10,4
	More than 60 years	19	1,9
	total	1009	100,0

The table 02 demonstrates that the distribution of age factor was concentrated in the second category (20 to 40 years old), mainly due to several key reasons, in particular that this age group represents the active and working population, which makes dynamic and perpetual mobility, and this is the main reason that made them the largest proportion of respondents during the interviews.

### 2. Educational level:

Table 03: the distribution of the educational level of the sample

		N	%
Educational level	Didn't enter school	33	3,3
	Secondary or less	230	22,8
	University	702	69,6
	Other	44	4,4
	Total	1009	100,0

The results included in this table highlights that the educational level of the sample is mainly concentrated in the Level of University by 69.6%, then the secondary or less level of education or by 22.8%, while the rest of the sample (the category of " Didn't enter school ", and the category of "other"), are presented by 3.3% and 4.4%, respectively of the whole sample; and this shows how important the young population's mobility, since the most active category are university students whom are generally aged between 20 and 40 years old.

### 3. Function

Table: 04 the distribution of the functional categories of the sample

		N	%
Function factor	Unemployed	88	8,7
	Student	477	47,3
	Employed	394	39,0
	Retired	25	2,5
	Other	25	2,5
	Total	1009	100,0

The results highlighted in the table above that the category of students is the mode category of the set data with a ratio of 47.3 %, followed by the category of workers, or employees by 39 % then the unemployed by 8.7 %, while the remaining two categories (Retired and Other) have the value 2.5% for each category.

These results are due to the fact that students and employees are the most needed categories to a dynamic mobility all along the day. However the retired and other categories have a limited mobility area and regarding to their needs to transportation the move less than any other categories.

### 4. Income:

The income factor which have been divided into four categories is presented in the following table

Table 05 the distribution of Income categories

		N	%
Income categories	Less than 15.000	597	59,4
	From 15.000 to 30.000	217	21,6
	From 30.000 to 45.000	126	12,5
	More than 45.000	65	6,5
	Σ	1005	100,0
Missed data		4	
Total		1009	

It's clear from Table 05 above that the category of people with an income less than 15,000 DA is the category acquired the largest proportion of the sample with a rate of 59.4 %, followed by the category of income ranged between 15000 DA and 30,000 DA by 21.6%.

The category of an income less than 15,000 DA are generally the category of students or workers from the working-class. These classes are characterized by their active and frequent movement in urban areas, while the second category which an estimated income between 15000 and 30000 DA may be the category of employees who consider urban mobility an essential activity in their daily lives and that their movements are relatively limited compared with the first category because of the nature of their movements which are more organized, especially in the peak times.

### 5. Marital Status

The factor of marital status is divided into four categories in which the category of (Father /Mother) was separated from the category of (Married), to study the effect of children in the mobility of their parents:

Table 06 the distribution of Marital Status factor

		N	%
Marital Status	Single	724	71,8
	Married	138	13,7
	Father/Mother	108	10,7
	Other	39	3,9
	Total	1009	100,0

According to Table 06, the mode category was Single (ie, the most frequent) with a rate of 71.8%, followed by the married ones (without children) 13.7 % and then the parents' category with 10.7 %.

Therefore, the low percentage of mobile couples who have children compared to married couples without children or single individuals explains the influence of the household responsibility which limits their movements in general.

#### 6. Residence location:

According to the geographical division of the city of Algiers and in following the requirements of the study we have divided the area of the survey into three sections and the table 7 the results as follow: -

Table: 07 the distribution of the Residence location of the sample

		N	%
Residence location	City centre	511	51,5
	Outskirts	350	35,2
	Outside the city	132	13,3
	Σ	993	100,0
	Missed data	16	
Total		1009	

According to the table 07, more than 50 % of the respondents live in the city centre and about 35 % of them in the outskirts of the city, while those who live outside the city has been accounted for 13.3%; it is important to mention that most of our sample live in the city centre because we considered the hyper centre within the centre.

#### 7. The disability status (for the handicapped people)

We have intentionally targeted the category of handicapped people in the points of the survey distribution, to study the effect of their disability on their use of different means of transportation and the results are presented in the following table

Table 08 The distribution of the disability status of the handicapped sample

		N	%
The disability status	Motor impairment	53	39,0
	Visual impairment	34	25,0
	Other	49	36,0
	Total	136	100,0

In Table 08 the number of respondents who suffer from a disability were 13.5 % of the total 1009 respondents, and regarding to the type of their disability we consider the following: motor impairment by 39 %, and the category of those who suffer from Visual impairment were 25% however the rest of the various disabilities or health problems were 36% combined.

Through these results we can see that the number of motor impairment are most frequent, and this shows that despite the

nature of their disability, they are using urban transport more than those who suffer from visual impairment, the later ones find it more difficult and in most cases they move only in the presence of companions.

#### C. Factors that influence the trade-off behaviour when it comes to choose between the private car and the common means of transport.

To know which of the personal factors influence the trade-off behaviour when it comes to choose between the private car and the common transport, we have first studied the opinion of commuters towards their preferred means of transport

Table 09 the opinion of commuters towards their preferred means of transport

Mean	1,82
Mode	Private car
standard deviation	,388

It is clear from the table 09 that the means of transport the most preferred in urban mobility is the private car, and it was the mode (the most frequent response

And the figure.... displays this fact obviously, where the personal car as the preferred means took 81.5%, and 18.5% representing those who choose collective urban transport as their preferred mode of transport in the urban areas.

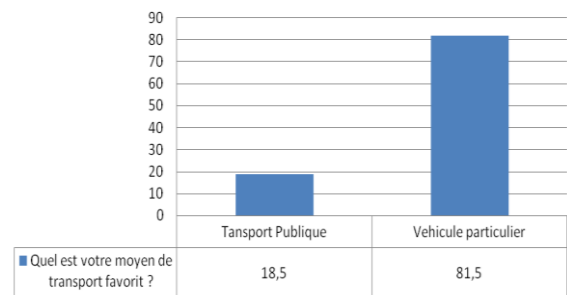


Fig. 02 The opinion of commuters towards their preferred means of transport

#### 5.3.1. The test of Pearson correlation coefficients between the human factors and the preferred means of transport:

After calculating the correlation coefficients of Pearson between the subjective factors of the sample and their preferred means of transport, to test the presence of a relation between these factors; where coefficients that have a level of significance at the level of less than (0.05) were characterized by the sign (\*) besides the correlation coefficient, and correlation coefficients with a level less than (0.01) were characterized by the doubled sign (\*\*). However correlation coefficients that have no statistical significant were left without signs.

We can see from the table 10 that the correlation coefficients of both the sex and the age that have 0.106 and -0.101 respectively are statically significant at a level less than 0.01 as it is shown in the bilateral Sig with the value 0.001 of both factors.

The same thing with the indicator of Education and the marital status which have 0.021 and 0.031 respectively; and they are statistically significant at a level less than 0.05 since the correlation coefficient of education is 0.073 and the correlation coefficient of

the marital status is 0.068; which means that these factors have a powerful influence on the trade-off behaviour

In the other hand the correlation coefficient of the function (profession), the Income, the residence location and the disability status (for the handicapped) all are more than the level of significance (0.05), and for this reason we assume that these factors' coefficients have not a strong correlation with the coefficient of the preferred means of transport, in other words, the cited factors do not influence the trade-off behaviour when it comes to choose between the private car and the common transport.

Table 10 : The test of Pearson correlation coefficients between the human factors and the preferred means of transport

		DSPVCTI //	Sex	Age	Level of Education	Function	Income	Marital situation	Residence location	Disability status
DSPVCTI//	P C	1	,106**	-,101**	,073*	-,005	,013	-,068*	-,049	-,029
	L.S.		,001	,001	,021	,869	,678	,031	,126	,741
Sex	P C	,106**	1	-,099**	,052	-,182**	-,217**	-,040	-,044	-,228**
	L.S.	,001		,002	,102	,000	,000	,204	,168	,007
Age	P C	-,101**	-,099**	1	,052	,455**	,417**	,310**	-,117**	,039
	L.S.	,001	,002		,097	,000	,000	,000	,000	,655
Level of Education	P C	,073*	,052	,052	1	,073*	,010	-,078*	,059	,119
	L.S.	,021	,102	,097		,021	,750	,013	,064	,167
Function	P C	-,005	-,182**	,455**	,073*	1	,610**	,289**	,056	,155
	L.S.	,869	,000	,000	,021		,000	,000	,077	,072
Income Marital situation	P C	,013	-,217**	,417**	,010	,610**	1	,356**	,001	-,033
	L.S.	-,068*	-,040	,310**	-,078*	,289**	,356**	1	,069*	,119
Residence location	P C	,031	,204	,000	,013	,000	,000		,030	,169
	L.S.	-,049	-,044	,117**	,059	,056	,001	,069*	1	,108
Disability status	P C	,126	,168	,000	,064	,077	,972	,030		,216
	L.S.	-,029	-,228**	,039	,119	,155	-,033	,119	,108	1
	P C	,741	,007	,655	,167	,072	,701	,169	,216	
	L.S.	1	,106**	-,101**	,073*	-,005	,013	-,068*	-,049	-,029

\*\* correlation is significant at the level =< 0.01 (bilatéral).  
\* correlation is significant at the level =< 0.05 (bilatéral).  
DSPVCTI = The Decision to shift from car use to common transport use after its improvement  
P C = Pearson correlation  
L.S. = Level of significance

D. The factors that influence the decision to shift from the use of personal vehicle to common transport:

After highlighting the main factors that affect the preference of commuters now we should find out the readiness of these commuters to move from using their preferred means which is the personal car to using the common transport as the main mode in their daily trips in urban areas

Table 11: The responses of our interviewed sample about whether they are ready to shift from the use of personal vehicle to common transport if the later one becomes more convenient.

		DSPVCTI //	Sex	Age	Level of Education	Function	Income	Marital situation	Residence location	Disability status
DSPVCTI//	P C	1	,020	-,020	-,065*	-,026	-,072*	,098**	,022	-,118
	L.S.		,545	,551	,047	,422	,029	,003	,510	,199
Sex	P C	,020	1	-,099**	,052	-,182**	-,217**	-,040	-,044	-,228**
	L.S.	,545		,002	,102	,000	,000	,204	,168	,007
Age	P C	-,020	-,099**	1	,052	,455**	,417**	,310**	-,117**	,039
	L.S.	,551	,002		,097	,000	,000	,000	,000	,655
Level of Education	P C	-,065*	,052	,052	1	,073*	,010	-,078*	,059	,119
	L.S.	,047	,102	,097		,021	,750	,013	,064	,167
Function	P C	-,026	-,182**	,455**	,073*	1	,610**	,289**	,056	,155
	L.S.	,422	,000	,000	,021		,000	,000	,077	,072
Income Marital situation	P C	-,072*	-,217**	,417**	,010	,610**	1	,356**	,001	-,033
	L.S.	,029	,000	,000	,750	,000	,000	,000	,972	,701
Residence location	P C	,098**	-,040	,310**	-,078*	,289**	,356**	1	,069*	,119
	L.S.	,003	,204	,000	,013	,000	,000		,030	,169
Disability status	P C	,022	-,044	,117**	,059	,056	,001	,069*	1	,108
	L.S.	,510	,168	,000	,064	,077	,972	,030		,216
	P C	-,118	-,228**	,039	,119	,155	-,033	,119	,108	1
	L.S.	,199	,007	,655	,167	,072	,701	,169	,216	

\*\* correlation is significant at the level =< 0.01 (bilatéral).  
\* correlation is significant at the level =< 0.05 (bilatéral).  
DSPVCTI = The Decision to shift from car use to common transport use after its improvement  
P C = Pearson correlation  
L.S. = Level of significance

1. The readiness of the sample to shift from the use of personal vehicle to common transport if the later one becomes more convenient.

Table 12 The readiness of the sample to shift from the use of personal vehicle to common transport

Mean	1,37
Mode	Yes
standard deviation	,482

The results table show that the mean is 1.37 which is near to the value 1 and this means that the majority of respondents answered "Yes" for the question that says "are you ready to shift from the use of personal vehicle to common transport in your urban mobility if the later one becomes more convenient.?" and the mode of the sample was also represented by "yes", and we can say that the items of our sample are stable since the value of the standard deviation is about 0.48

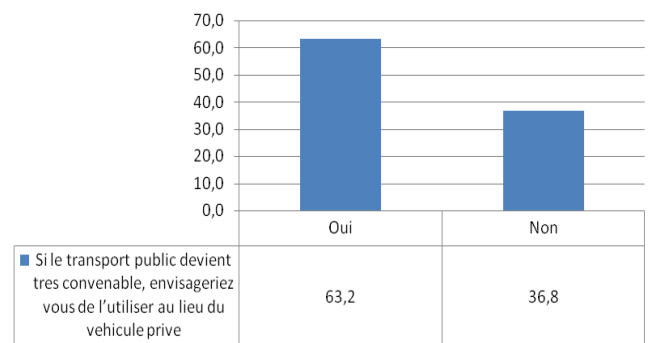


Fig. 03 The readiness of the sample to shift from the use of personal vehicle to common transport:

It is clear that the majority of commuters interviewed in our study are with the shift from the use of the private car to the common transport if this one becomes more convenient and 63.2 of the sample say "yes"

2. *The test of Pearson correlation coefficients to the human factors the decision to shift from the use of personal vehicle to common transport if the later one becomes more convenient.*

From the results presented in the matrix of coefficients in table 11 we can see that the level of bilateral significance of Education, the Income and the marital status equals respectively: 0.047 , 0.029 and 0.003 with correlation coefficients -0.065\* , -0.072\* and 0.098\*\* and all these coefficients' values are less than 0.05, which means that they all have a strong correlation with the intention to shift from the use of use their personal vehicle to the use of common transport if the last one is improved. So we can say that the Educational level, the Income and the marital status are human factors that influence strongly the decision of shifting from the use the personal vehicle to the use of common transport in urban commuting.

The other factors are not statistically significant and their correlation coefficients are more than the level of significance (0.05) which means that they are factors that do not influence the decision to shift from the use of personal vehicle to common transport in urban commuting even if the last means of transport are improved.

#### V. DISCUSSIONS:

The key finding in this study has confirmed the real importance of human factors when it comes to their effect on the trade-off behaviour between the use of the personal car and the common transport, and according to the tests applied on the results studied before we can consider the following:

- From the study we can conclude that Personal characteristics have a statistically significant relationship with the trade-off behaviour, and more precisely: the sex, the age, the educational level and the marital status are statically significant factors and they have a powerful influence on the trade-off behaviour.
  - The majority of commuters interviewed in our study are with the shift from the use of the private car to the common transport if this one becomes more convenient and 63.2 of the sample say "yes".
  - The Educational level, the Income and the marital status are human factors that influence strongly the decision of shifting from the use the personal vehicle to the use of common transport in urban commuting. the other factors are not statistically significant which means that they are factors that may not influence strongly the decision to shift from the use of personal vehicle to common transport in urban commuting even if the last means of transport are improved.
- it is important to mention that human factors influencing the human behaviour, are not limited to the personal characteristics of individuals, but the later ones have an important influence especially on the behaviour of commuting and mode choice

behaviour since people travel whether individually of in groups, according to their financial and marital conditions.

Finally, decision makers should take in consideration the study of personal characteristics as human factors affecting the commuting behaviour, which leads to a better understanding to mode choice behaviour and the trade-off behaviour, and this would certainly make policies and decisions more effective to develop transportation plans leading to a more sustainable mobility in urban areas.

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