PUBLIC TRANSPORT ESCAPABILITY COSTS: IT’S EFFECT ON COMMUTERS IN NIGERIA

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ABSTRACT

This paper evaluates the impact of weather on cost saving or escape in public transport operation in Nigeria. An escapability cost is the saving of resources achieved by discontinuing the service on a particular route or discontinuing the service at a particular timings or clubbing two services. Transport service cannot be stored and it will be wasted, if services created are unused. Therefore, these two ends have to be balanced economically, if the transport company wants to remain in the business. Judgmental sampling was employed to select these four towns along the same route (Ibadan, Oyo, Ogbomoso and Ilorin) among two States (Oyo State and Kwara State) in Nigeria. The population was sub-divided into drivers, commuters and other road users through stratified sampling. A correlation technique was used to analyze the respondents’ response. The correlation matrix result shows that, the delay induced during transhipment and low level of patronage are significantly correlated at p ≥ 0.597* at 0.05 confidence level. It also shows that, discontinuing the journey (escape) has significant impact on delay and level of patronage at .538* and .542* respectively at 0.05 levels. Findings revealed that escape or cost saving in public transport increase vehicle operating costs; reduce level of patronage because of discomfort imposed on commuters. This is usually felt when it is raining and during harsh weather. The findings in the table 2 shows that the regression model is statistically significant at the 0.05 level (R² = 84, F = 179.171, p < 0.000). This means that there is a significant social impact of transport escapability cost on commuters. 

Keyword: Escapability costs, Operating costs, Commuters, Public transport and Environmental factors.

1.1 Introduction

Transportation is an essential component of modern society, connecting people to their workplaces, schools, healthcare facilities, and other essential services. Public transport systems play a critical role in providing affordable and accessible transportation to millions of people worldwide. However, the cost of providing public transport services can be substantial, especially in areas with low population densities or low levels of demand. In such cases, transport providers may be inclined to engage in transport escapability, where they avoid taking certain trips or routes because they do not generate enough revenue to cover their costs or generate a reasonable profit.

An escapability cost is the saving of resources achieved by discontinuing the services on a particular route or discontinuing the services on a particular timings or clubbing two services. Transport service cannot be stored and it...
will be wasted, if services created are unused. Therefore, these two ends have to be balanced economically, if the transport company wants to remain in the business. Transport costs are the addition of vehicle cost, operating costs, social cost and environmental costs. The two major costs that mainly concern the transport operator are fixed cost and variable costs while rendering services.

The prevalence and causes of transport escapability among public transport providers and operators are complex and multifaceted and can vary depending on a range of factors such as passenger demand, operational costs, and competition from other transport providers. Transport escapability is defined as the practice of public transport providers refusing to take certain trips or routes, or avoiding certain destinations, in order to maximize their profits (Kaplan et al., 2013).

Transport costs has been a major concerned through the universe, since transport play significant role in any given country economy development. Though, the two basic transport costs are: Social and Private cost. Social costs are costs that are not borne directly by the operators while private costs are cost that are borne directly by the operators. Private costs are divided into fixed and variable costs and the main different between fixed costs and variable costs is that the former is inescapable while the latter is escapable.

Cost saving is the discontinuing in the journey (escaped) or clubbing of two services together in road mode of transport. There are so many reasons for transport operators to discontinuing in the course of journey: number of passengers remains in the vehicle, distance of the journey, empty running among others. Failure to consider this may increase vehicle operating costs.

Operating costs (running costs) is the amount transport operators incurred in moving passengers from one place to another. Variable costs depend on the level of services being provided, distance travelled, volume of traffic carried. The components of vehicle operating costs includes: fuel, crew wages, repair and maintenance. All these costs are” escapable” since they only occur when transport is operating and each be avoided by cancelling services.

The operators determine a load factor which reduces cost of the journey and variables costs of each passenger carried. An extra passenger over the budgeted break-even point incurs a low marginal cost and represents substantial profit. Clubbing of services majorly occur during the off-peak period (season) or when transport operators carry less than load units of different destination along the same route together. This mostly occurs at night or among the unorganized public transport.

Journey distance has been one of the reason(s) for passengers to transfer from one vehicle to another. This could happen in this two broad way: if there is no direct vehicle from origin to destination or the number of passenger is below the load unit. Therefore, clubbing of transport services has to come to play, so as to reduce vehicle operating costs (cost saving).

Impact of weather on cost saving or escape in public transport operation has been a major concerned to passenger making use of unorganized public transport. Weather in this research work was refers to as; rain, sun and darkness; this has ripple effect on passengers in numerous ways.

Whether “avoidable” costs can be covered need a proper consideration which appears to be simple rule but it is often complex to
apply in practice since some costs are avoidable in the long-run but not in the short-run, some costs are shared or are joined between a numbers of activities (Brake et al, 2006). Avoidable costs are sometime confused with the concept of fixed and variable costs. Though, there is some connection but there is no direct relationship. For example, if transport operator (driver) sees that the passenger inside the bus is below load units, might decide to transfer his passengers to another bus which also carries less than load unit and going to the same destination. In doing this, the variable costs (fuel, tire, maintenance among others) will be escaped (saved), but fixed costs (driver’s wages, insurance, and registration among others) will be in escaped. Therefore, this research will examine public transport escapability Costs and its effect on commuters in Nigeria.

2.0 Literature

In the modern era, people anticipate the ability to move around and reach essential services easily. In the 21st century, having a private car has been linked to the possibilities it provides (Brake et al, 2005). However, a significant portion of the population lacks access to private vehicles and depends exclusively on public buses for their transportation and social interactions. The provision of public transportation services involves making choices about operational aspects such as vehicle selection and the incorporation of technology, among other considerations.

According to Guo and Wilson (2011), it was proposed that enhancing comprehension of transfer behavior and making improvements to the transfer experience could have a notable positive impact on public transport systems. Transfers are a common aspect of public transport networks, particularly within expansive multimodal networks (Vuchic, 2006). In these systems, passengers often need to switch between various modes and services to reach their destinations. To illustrate, in London, roughly 70% of Underground journeys and 30% of bus journeys entail at least one transfer (Transport for London, 2001). Similarly, in Munich and Paris, approximately 70% and 40% of all public transport trips, respectively, involve one or more transfers (GUIDE, 2000).

Transfers are commonly viewed as an essential yet undesirable aspect of public transportation, resembling a double-edged coin. On one side, they enable the expansion of service coverage and the development of intricate multimodal networks. On the other side, they disrupt the travel experience and diminish the competitiveness of public transport compared to private vehicles that offer seamless door-to-door service. Inconvenient transfer experiences have the potential to dissuade prospective passengers (CTPS, 1997; Wardman, 2001), diminish the satisfaction of current riders (Hine and Scott, 2000), and influence passengers’ decisions regarding routes and destinations within the public transport system (Lam and Xie, 2002).

The absence of adequate analytical instruments for comprehending transfer behavior and appraising enhancements to the transfer process impacts the characteristics of transfers. Numerous elements associated with transfers, which hold significance for commuters, prove challenging to measure accurately. Individually, these factors might exert minimal influence. Nonetheless, the oversight lies in not accounting for the comparative significance of these attributes when contrasted with conventional factors such as time and cost.
Furthermore, the differentiation of these factors across various transfer facilities has not been adequately addressed (Evans, 2004; Seki and Taylor, 2009).

The transfer experience can be deconstructed into three distinct components: transfer walking, waiting, and the transfer penalty, which primarily encompasses psychological aspects linked to transfers influenced by the transfer environment (Ortuzar and Willumsen, 2004). Each of these components holds specific implications for policy considerations. An integrated public transportation system facilitates convenient travel between various points of origin and destinations, thereby enhancing the overall efficiency of the system (Bak et al., 2012). However, within such a system, commuters often encounter the necessity of making transfers. Historically, making a transfer during a journey has been perceived negatively by commuters, often seen as a 'penalty' or 'cost'. This negative perception arises due to additional fares, increased walking and waiting times. The process of transferring disrupts journeys, diminishes passenger satisfaction, dissuades potential new users of public transport, and impacts the decisions passengers make regarding their routes (Chowdhury and Ceder, 2013).

The regrettable circumstance within the disorganized realm of public transportation is the absence of distinctive bus operating trademarks, leading to a merging of corporate identities. This scenario is exacerbated by the fact that individual bus owners, averaging two vehicles per owner, prioritize their personal gains and engage in counterproductive and aggressive competition. This behavior hinders the consideration of passenger well-being and service quality (Zahir et al., 2000). In this context, a fixed timetable and schedule for bus services across all transit routes are conspicuously absent. The services are characterized by marked irregularity, unreliability, discomfort, and overcrowding due to a lack of professional management, dependable scheduling, established bus timetables, lengthy waiting periods, inconvenient access and exit facilities, as well as erratic driver stopping patterns during both peak and off-peak periods. Consequently, the utilization of bus services is largely confined to economically disadvantaged passengers who lack alternatives and cannot afford other modes of transportation. These passengers typically shift to alternative modes as their incomes rise.

2.1 Distance Fare

The primary advantage of adopting Distance Fares lies in the cost savings associated with transfers. To illustrate this, consider an average journey of 187 kilometers involving a single transfer, based on the fare levels from 2016. If a 20% transfer rebate were applied to the transfer leg, the total adult public transportation fare for the entire journey would amount to 1000 naira. However, with the implementation of Distance Fares, the cost would decrease to 800 naira for the same journey. Thus, even without any alterations in travel behaviors, commuters who include transfers in their journeys would experience reduced travel expenses under Distance Fares, as compared to the fixed-rate transfer rebate model (Lool and Dan, 2015).

However, the influence of Distance Fares extends beyond mere savings on existing transfers; it also triggers shifts in commuters' travel behaviors. Commuters who include transfers in their journeys would experience reduced travel expenses under Distance Fares, as compared to the fixed-rate transfer rebate model (Lool and Dan, 2015).
duration, and expenses. Opting for a direct journey holds appeal not just due to its convenience and straightforwardness, resulting in fewer complications, but also because it incurs only a single boarding charge, leading to a reduced fare compared to a journey involving transfers. By implementing Distance Fares, the fare discrepancy between direct and transfer journeys is effectively eliminated. Consequently, commuters might alter their route decisions based on alternative factors, such as minimizing waiting times at bus stops, shorter overall travel distances, higher travel speeds, or greater journey predictability.

2.2 More Transfers

Commuters are anticipated to engage in a greater number of transfer-based journeys within the framework of Distance Fares. These transfers can encompass shifts between distinct bus services (referred to as bus-bus transfers) or transitions between diverse modes, such as buses and trains (known as bus-rail transfers). A comprehensive examination of the travel patterns exhibited by the same group of commuters over a span of three years reveals that both forms of transfers underwent augmentation during this period, and these increments are plausibly linked to the introduction of Distance Fares. The influence of Distance Fares on bus commuters can be approached from two vantage points. The first perspective pertains to its influence on route selections. Commuters may now opt for transfer-based journeys that they were hesitant to undertake previously.

The second perspective pertains to the increased flexibility in commuters' decisions while waiting for buses. The implementation of Distance Fares implies that they won't encounter escalated travel expenses if they were to board a bus that necessitates transfers later on, as opposed to selecting a direct service. Consequently, while awaiting a bus, they are not compelled to persist in waiting for a direct service, which generally involves lengthier waiting times at bus stops. Instead, they might board the earliest suitable bus that arrives and subsequently transfer to another bus (potentially operating at shorter intervals than the direct service) at a later point in their journey to attain their destinations more expeditiously. This method of leapfrogging, involving boarding and disembarking from a few services, could conceivably lead to a reduction in overall journey times. The cumulative impact of these dynamics is evident in the escalation of bus-bus transfer journeys.

These costs are incurred in direct proportion to the volume of traffic flow and thus exhibit variability based on the level of passing traffic. They encompass expenditures linked to fuel consumption, crew wages, and vehicle maintenance arising from the operation of vehicles within traffic service. For instance, these costs might involve activities like changing worn bus tires or conducting regular inspections of buses after specific journey durations. These expenses are termed 'escapable' since they can be sidestepped or averted by not operating a particular train, suspending a specific flight, or by private vehicle owners choosing not to drive and instead walking to their destinations. However, there is a crucial consideration that introduces complexity to an otherwise straightforward concept. In the extremely short term, suspending the final bus on a Saturday night will likely impact primarily fuel consumption and tire wear. Even the driver would need to be remunerated their guaranteed minimum weekly wages.
The reliability of commuting times holds significance due to the established positive correlation between unpredictability in journey durations and both subjective and objective stress-related indicators among commuters (Tse et al., 2000). Bhat and Sardesai (2006) outline two possible reasons underlying the influence of travel time reliability on commuter travel choices. Firstly, tardiness at the workplace is likely to yield adverse consequences for commuters. Secondly, commuters inherently value the assurance offered by a dependable transportation system, irrespective of any repercussions tied to punctuality. It is these considerations that render unreliable transportation systems accountable for inducing commuter stress.

The lacks of reliability and frequent delays experienced by commuter trains in London have been associated with reduced productivity and efficiency in fatigued workers. This decline in productivity has been approximated to result in an annual cost of at least £230 million to the city of London (Cox et al., 2006). A connection exists between the number of stops along a given route and the effective travel duration for passengers. Bus routes characterized by a higher frequency of stops enable passengers to swiftly reach a stop but subsequently lead to extended travel times while on board. The strategic placement of stops—either too distant or too closely spaced—can inadvertently extend transit travel times for passengers. An excessive number of bus stops elevates travel durations on the bus itself, whereas a scarcity of stops elongates the time required to walk to a stop. The optimization of stop spacing necessitates striking a balance between minimizing walk times to bus stops and ensuring streamlined bus operations.

2.3 Methodology

Multi-stage sampling was used to select North central and South – west among the six geo-political zone while judgmental sampling was employed to select these towns (Ibadan, Oyo, Ogbomoso and Ilorin) among two States (Oyo State and Kwara State) in Nigeria. The population was subdivided into drivers, commuters and other road users through stratified sampling. Correlation techniques were used to analyze the respondents’ response. Evaluation of the relationship between dependent and independent variable was performed using correlation technique. The first step consisted of defining the variable of interest. In this study, the escapability costs in the study area were cost saving or escaped cost. The escapability cost is the dependent variable (Y) and below are the independents variables:

\[ X_1 = \text{Delay} \]
\[ X_2 = \text{Level of patronage} \]
\[ X_3 = \text{Empty running} \]
\[ X_4 = \text{Cost saving} \]
\[ X_5 = \text{Weather} \]

2.4 Study Area

Oyo State is the largest state in Southwestern Nigeria which has a population of 5.592 million while Kwara state is part of North-central in Nigeria with a population of (Census, 2006). Oyo state has latitude 8.1169°N and longitude 3.4196°E while Kwara has latitude 8.9848°N, 4.5624°E respectively. Ibadan, Oyo, Ogbomoso and Ilorin link by a road network which actually pass through them and serves as bases for immediate interrelationship. This road network improves the economic activities along the route.
2.5 Result and Findings

The correlation matrix in table 1 shows that some independent variables are highly correlated with each other while other indicates low or little correlation. For example, X1 (delay) has strong correlations with variable X2 (level of passengers patronage). This indicated that delay posed by unorganized public transport operators reduced the level of passenger patronage and the delay were caused by operators in the process of saving costs or clubbing two services together.

Variable (X2) level of passenger patronage has strong negative correlation with variable (X3) empty running of (-.577), this shows that the higher the level of passengers patronage, the more the rate of empty running. From the above table one could deduce that no passenger would like to patronize an operator that will transfer his passengers to another bus.

Variable X4 (saving costs) has strong correlation with variable X1 (delay) and X2 (level of passenger patronage) of .538* and .542* respectively. This revealed that cost saving (escapad) by transport operator caused delay and also reduced level of passenger patronage.

Variable X5 (weather) has strong correlation with variable X2 (level of passenger patronage) and X4 (saving costs) of .656* and .508* respectively. For instance, driver who ply Ibadan-Ilorin route and based in Oyo or Ogbomoso, would definitely discontinuing the service, so as to avoid empty running.

Table 1: Correlation matrix of escapability costs and commuters

<table>
<thead>
<tr>
<th>Variable</th>
<th>x1</th>
<th>x2</th>
<th>x3</th>
<th>x4</th>
<th>x5</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x2</td>
<td>.597*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x3</td>
<td>.027</td>
<td>-.577*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x4</td>
<td>.538*</td>
<td>.542*</td>
<td>.173</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>x5</td>
<td>.542</td>
<td>.656*</td>
<td>-.049</td>
<td>.508*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Significant coefficient ± 0.05 at 0.05 confidence level

Table 2 shows the economic impact of transport escapability cost on drivers, as indicated by a sample of drivers. The drivers identified several factors that affect their income and job satisfaction. The most commonly reported impact was fuel cost, which was reported by 40% of the drivers, Empty running cost was reported by 27% of the drivers, reduce maintenance cost was reported by 9% of drivers, reduce travel time was reported by 7% of drivers while the remaining of drivers reported reduce risk of accidents.
Table 2: The economic impact of transport escapability cost on drivers

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel cost</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Empty running</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td>Reduce risk of accidents and injuries</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Reduce maintenance cost</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Increase travel time</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: Author’s Field Survey (2023)*

The table 2 indicates that 32% of the respondents agree that discomfortability is a social impact of transport escapability, 17% of the respondents agree that delay/time constraint is a social impact of transport escapability, 29% of the respondents agree that increased time travel is a social impact of transport escapability, 14.5% of the respondents agree safety concern is a social impact of transport escapability while 7.5% of the respondents agree that loss of luggage’s is a social impact of transport escapability.

Table 3: The social impact of transport escapability on commuters

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discomfortability</td>
<td>64</td>
<td>32</td>
</tr>
<tr>
<td>Delay/ Time constraint</td>
<td>34</td>
<td>17</td>
</tr>
<tr>
<td>Increase travel time</td>
<td>58</td>
<td>29</td>
</tr>
<tr>
<td>Safety concerns</td>
<td>29</td>
<td>14.5</td>
</tr>
<tr>
<td>Loss of goods</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: Author’s Field Survey (2023)*

The table 3 shows the results of the R value of 0.918 indicates a strong correlation between the predictors and the outcome. The R square value of 84% of the variation in drivers can be explained by the model. The adjusted R square value of 0.834 adjusts for the number of predictors in the model and is usually lower than R square. The F value of 259.342 and the p-value of 0.000 indicate that there is economic impact of transport escapability cost on drivers.

Table 4: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.918*</td>
<td>.842</td>
<td>.834</td>
<td>.65168</td>
</tr>
</tbody>
</table>

* Article published on boldscholar.com. Verify this document by clicking here
The table 5 shows the results of a multiple linear regression analysis that examines social impact of transport escapability cost on commuters. The model summary shows that the multiple correlation coefficients (R) is 0.887, which means that there is a moderate positive correlation between the independent variables and the dependent variable. The coefficient of determination (R Square) is 0.780, which means that 79% of the variation in commuter satisfaction can be explained by the independent variables. The ANOVA table shows that the regression model is statistically significant at the 0.05 level (F = 179.171, p < 0.000). This means that there is a significant social impact of transport escapability cost on commuters.

### Table 5: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.887&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.786</td>
<td>.781</td>
<td>.85375</td>
</tr>
</tbody>
</table>

### ANOVA<sup>a</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>151.221</td>
<td>4</td>
<td>37.805</td>
<td>179.171</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>41.196</td>
<td>195</td>
<td>.211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>192.417</td>
<td>199</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.6 Conclusion

Saving costs (escape costs) usually rampant among unorganized public transport operators in the regions. Avoidable costs (fuel, maintenance, tyre, driver wages, oil among others) and fixed costs (trip ticket, insurance, depreciation among others). Though, drivers wages is regarded has fixed cost but in unorganized public transport it is an operating costs, since their wages is based on number of trips in a particular day. Trip ticket collecting by road transport union is a fixed cost rather than the operating costs seen in an organized public transport; since ticket collected cover Ibadan – Ilorin and not matter discontinuing in the course of rendering such service.

Delay was necessitated to avoid empty running and at the same time posed problem for passengers by increasing travel time, lost or stolen of luggage during...
transshipment, discomfort cause by weather (rain, sun and darkness). These among others reduce the level of passengers’ patronage in an unorganized public transport. Therefore, if this transfer must occur it should be done inside park and not along the road sides. Passengers should be notified about the transfer and it should be done in urgency to avoid unnecessary delay. Public transport providers should consider these findings when designing services and amenities to ensure they align with the preferences and needs of commuters.

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