

## Intermodal Transportation System in an Evolving Economy

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In spite of the fact that Nigeria is variously endowed with natural resources for multi-modal transport system operation, majority of the people use pre dominantly only one mode of transport (road) in situations where integration of the different modes will bring flexibility, safety (of persons, infrastructure, goods and environment), efficiency, effectiveness and conducive economic competition. The inability to fully and reasonably integrate the various modes of transport does also brought increase in mobility problems, such as traffic congestion, environmental pollution, preventable accidents, and untimely damage to roads, criminal inclination, incessantly increase in operational cost. This paper discusses the necessity and importance of integrated transport

system in an inter – modal (multi modal) arrangement which primarily involves road, rail, air and sea (inland waterway). An intermodal co-ordination which focuses mainly on public transport system based on public/private participation will also be discussed within the purview and space of this paper. Methodology employed in the study involve primary and secondary data, primary data in form of personal interviews conducted and observation while secondary data are deduced from previous publications like academic journals, research papers, newspapers, public/private agencies and others.

**Keywords:** Transportation system, economy, Nigeria

### INTRODUCTION

Integrated transport system is the harmonious co-ordination of all modes of transport to achieve the conveyance of persons, goods and services from the point of embarkment to the point of destination. For example, a journey from one's home to work place may take the form of combination of trekking, motorbike, bus on one hand, another journey say, from Lagos to Abuja, may take in addition to the above, air transport. Cargo services both at the sea and airports are operated through the land – maritime land and land – aviation – land system respectively Badejo, (2001).

The necessity of transport as a means of time space utility cannot be overemphasized. As a derived function which transport is, the socio-economic life of the people determines to what use transport will be put, this is also with the consideration of population size, geography of

various locations, predominant trade of the population to be served, physical attributes of the population to be served as well as the nature of the environment meant to be used for transportation. This further means that the various transport modes are better used in a harmoniously integrated manner for socio-economic advancement, even infrastructural development, modal cohesion, safety, efficiency and effective utilization Lord, (1992).

This paper seeks to highlight the under listed items to bring to public knowledge, government, business communities, academics and the general populace, the necessity and importance of an integrated transport system in a highly populated country like Nigeria where business, tourism and culture (patrons of transport) are abound with a view to proffer solution to identified

problems.

Non-existence or incoherent integration of transport modes in a harmonious manner for both economic and social purposes has resulted in avoidable anguish to people, especially the low income class. This is so because, situations like multiple car ownership in which case one person or family has between three or five cars for a single family. This has aggravated hardship and corruption with impunity that has plagued the Nigerian nation, it has encouraged unlawful competition to own more among the elite class while the less privileged have continued to wallow in poverty, causing bickering and bitterness against the elite class and this has resulted in the various criminal activities, such as ethnic militancy, terrorism, kidnapping and armed robbery, contract scamming, half-baked graduates because of the haste for money and unabated struggle for the available resources from mono-product economy of the country (petroleum products). According to Badejo, (2001) integration of various modes in a harmonious manner is a panacea for industrialization and a big source of sustainable employment. Keiran, (2005) posited that lack of modal integration in transport has led to indiscriminate use of road tankers which had led to overpricing, accident, delay, infrastructure decay and political killing of the rail system. Nigerian cities, towns and rural communities are endowed with various afore-stated characteristics; natural, human, economic and social; ironically, the various modes of transport that can blend the use of the integrated system in accordance to prevailing circumstances to achieve the desired space utility in a harmonious manner has not been fully practiced. According to Badejo, it is quite obvious that only one form of transportation mode (road) is persistently used even though the threshold requirements that can make the use of other modes possible are available. Simpson (2013), posited that evolution of the various modes of transport had brought more and better meanings to life and living and that without transport the world, particularly Africa (on which emphasis was been placed) would have remained primitive and uncomfortable Simpson, (2013).

In the last one century, various transport and their threshold facilities have been developed in different shapes and volumes, but the utility of most modes has either been erratic or inexplicably ignored Simpson, (1980). This then brought a whole lot of inconvenient atmosphere in terms of modal over-dependence, rendering other modes either underutilized or inefficient, lack of infrastructural and capacity building for other modes, weakness or outright deformation of facilities built for un-used modes, over-use and incessant damage to predominantly used mode, exploitation, economic and environmental negativities as a result of moribund or inefficient sub-modes, corruption, and so on. Most or all of the above negativities can be overcome through efficiently utilized integrated transport system.

Adewole, (2002) declared that accidents are better

prevented than handled. Adewole, (2002) said that this can only be done meaningfully by making sure rail and water transportation economically resuscitated, indiscriminate use of tankers is significantly reduced and multi modal transport system is enshrined with serious minded economic agenda. The task of this paper is to find out if integrated transport system is being practiced in Nigeria now or has ever been practiced. If not, why are we not practicing it? What factors are contributing to our inability to integrate our transport system? Or in the recent time has there been any change? If yes, where and how was the change effected and what factors made this possible? What can we do to ensure that the various transportation modes are truly and functionally integrated? These and some other issues are sought by this paper with a view to providing answers to them.

## **METHODOLOGY**

Instrument used for this study includes research questionnaire administered to respondents for data collection. Itemized questions were used for collecting responses from a population that comprised transporters and users in Nigeria. Samples of 12 transport workers and 82 transport users that completed and returned the questionnaire were used for this study. It also involved personal interviews with respondents. Forty (40) question items were included. The mean was used to answer the research questions to determine level of agree or disagree to each question item, 4-point scale of strongly agree, agree, disagree or strongly disagree was assigned. The cutoff point was fixed at 2.50, therefore any item that attracted up to 2.50 and above was considered agreed, while any mean below 2.50 was regarded disagreed.

### **Scope of the study**

This study covers the major transport modes in Nigeria that are needed in an integrated system. Road, rail, inland waterway, aviation and pipeline are to be covered. Since these transport systems have their varying characteristics and operators, efforts was concentrated mainly on the experienced operators, operations and users of the various modes in order to have credible coverage based on practical and day to day experiences.

### **Limitation of study**

Reluctance and foot-dragging attitude of interviews as well as time limitation are likely factors that are expected.

### **Research questions**

To what extent does the government policy affect transport modal integration?

$$X^2 = \frac{\sum (O_1 - E_1)^2}{E_1}$$

$N_1$  = 12 (sample of transporters)

$N_2$  = 82 (sample of transport users)

$X_1$  = Mean of sampled transporters

$X_2$  = Mean of sampled transport users

$X_t$  = Mean of  $\sum X_1, X_2$

## RESULTS

Analysis of (Table 1) shows that respondents agreed with all items except items 1 and 3. This shows that people who have been saddled with the responsibility of policy implementation and ministerial administration of the transport sector have performed short of professional expectations, this might inform the responses in item 3, where it was disagreed that funds allocated to transport sector are judiciously utilized even in spite of the fact that item 2 has the unanimity of agreement as to adequacy of funds allocation on annual basis. Item 4 also confirmed the absence professionalism in the transport sector as responsibilities were agreed to have been left to people of any sort of idea. Responses in item 5 agree the need for genuine and intensive advocacy for the transport sector to bring about meaningful integration to move away from over use of one mode of transport at the expense of others. Item 6 agreed on "monopoly" due to characters involved. Item 7 unanimously agreed on the fact that even government white papers that were released variously were seldom implemented, hence, the carryover of the problems in the sector while item 8 responses overwhelmingly supported the fact that lack of adequate power sharing among the different tiers of government has led to some over loads on some modes of transport, vacuum in others and the attendant infrastructural decay and deficit. Examples of this could be seen at the compound of the Nigerian Railway Cooperation, Ebute-Metta, Lagos. Looking into (Table 2), all the items concerning the role of transport modes integration on socio-economic lives of Nigerians were agreed with except item 11 which depicts some ignorance on the part of some respondents concerning the rail transport effect on safety, efficiency and cost. However, the overwhelming agreement with other question items in (Table 2) is a confirmation of Lord Lugard's work, (1922) who observed that without true integration of transport modes, lives, especially in Africa would remain primitive and backward. Small, medium and large scale enterprises depend on various modes of transport due to the various products characteristics, we have perishable requiring refrigerated vehicles, we have products with particular shapes requiring special packaging, we have liquid/powder products etc. Whereas, without these transport related activities, no nation, races or community can made the two ends meet.

Table 3 reveals the need to have policy makers in transport that have genuine interest to implement policy papers that will move the sector forward. Of particular note is item 22 in (Table 3) where respondents agreed with the fact the lack concerted (deserved) attention given to rail transport has led to uncontrolled (over) use of road transport, this is more particular in the haulage and passenger sub-sectors where the practice has defied both cost and operational norms, roads have been damaged, crimes have escalated, costs have indiscriminately jerked up and the sub-sector has become chaotic and disorderly.

Badejo, (2002) says the contemporary thinking in world transportation is that of being environment friendly, i.e. a spirited effort is needed worldwide to seek how to abate pollution, noise and ozone depletion. These he said, are the relevant necessities for the need to give concerted attention to rail transportation due to overwhelming advantages of less toxic emissions (almost zero pollution), curtailed noise, safe, cheap, efficient and reliable. It is also useful to contain urban traffic dilemma (traffic congestion) he said, will be used as a strategy to redistribute the population and uplift infrastructural assets in some areas due to the accessibility. With this concept implemented, issues of land use imbalance, industrial and urban development, sectoral advocacy and private sector participation problems will be successfully solved as agreed by respondents. Item 24 in this table where respondents disagreed confirms the attitude of Nigerian policy makers to both domestic and global agreements. It was not agreed that implementation of global treaties will encourage facility development. Respondents' experience of Nigerian government attitude towards budget implementation level, year in year out which has always been below expectation and globally acceptable norms might have informed these responses. In item 25, agreed that urban and industrial developments are dependent to a large extent on transport integration. Brooke, (2013) stressed the importance of inter-modal co-ordination/integration of all transport modes. He further stressed the need for the policy makers to institute or establish the National Transport Commission (NTC) which would be charged with the responsibility of research, policy formulation/implementation as well as development of the transport industry. The commission should comprise tested, experienced and passionate professionals in their own right, be they in industry, academics, finance and bureaucracy (Private/public participation). The agreed position of respondents in item 26 (Table 3) will have its shortcomings addressed by afore-stated recommendation of Robbins, (1995) on private/public participation through the institution of National Transport Commission. Item 27, positions on land use policy are a vital issue. A situation where a mode of transport is predominant will create a chaotic environment because the practice will surely defy practice norms just as it seems today in many Nigerian

**Table 1.** To what extent will government policy guidelines affect intermodal transportation?

S/N	Items	N <sub>1</sub> =12    N <sub>2</sub> = 82			Remarks
		X <sub>1</sub>	X <sub>2</sub>	X <sub>t</sub>	
1	Ministerial appointees to the transport sector are well informed professionals	2.56	2.30	2.43	Disagree
2	Adequate burglary allocations are made yearly to implement policy on transport	2.56	2.54	2.55	Agree
3	Funds meant for the transport sector are judiciously utilized	2.11	1.99	2.05	Disagree
4	Transport practice has been long left as non-professional in the real sense	2.65	3.20	2.93	Agree
5	Absence of genuine advocacy has led to over concentration on certain transport modes	2.60	2.42	2.52	Agree
6	Characters of government office holders have allowed monopoly	2.86	3.50	3.18	Agree
7	Successive white papers on transport policy were seldom implemented	2.72	2.68	2.70	Agree
8	Lack of adequate power sharing among tiers of government (local, state and federal) has led to overload and neglect of infrastructure	3.1	2.7	2.82	Agree

**Table 2.** To what extent will inter-modal transport system assist the Nigerian economy?

S/N	Items	N <sub>1</sub> = 12    N <sub>2</sub> = 82		
		X <sub>1</sub>	X <sub>2</sub>	X <sub>t</sub>
9	Availability of different transport system modes encourages healthy use and fair pricing	1.84	3.44	2.64
10	Riverine people will have better socio-economic lives with functional inland water transportation	2.75	2.93	2.84
11	Transportation of bulk goods through the rail prompts safety, efficiency and affordable cost	1.86	2.73	2.26
12	Total transport from air and sea ports will encourage harmonious use of all modes	2.62	2.81	2.72
13	Years of neglect of the Nigerian rail system has led to indiscriminate increase in transport cost	2.93	3.05	2.99
14	Cost of commodities are primarily determined by transport cost	3.22	3.65	2.94
15	Perishable item prices can move up due to spoilage during erratic or delayed transportation	2.68	3.42	3.05
16	Harmonious use of all modes will create more jobs	3.21	3.14	3.18
17	Transport integration will lead to more revenue yield to the government	2.88	2.76	2.82
18	Integration of transport modes will promote better environment	1.98	3.43	2.71

**Table 3.** How corporate attitudes of the stakeholders in the transport sector will affects the intermodal transportation system.

S/N	Items	N <sub>1</sub> =12    N <sub>2</sub> = 82			Remarks
		X <sub>1</sub>	X <sub>2</sub>	X <sub>t</sub>	
19	Objective interest of policy makers and implementers will result in good decision making	2.72	2.63	2.68	Agree
20	Involvement of experienced professionals is inevitable to achieve meaningful modal integration	1.98	3.52	2.75	Agree
21	Adequate funding of transport infrastructure plays an important role	2.88	2.90	2.89	Agree
22	Lack of concerted attention given to rail transport has led to uncontrolled use of road transport	2.68	2.82	2.75	Agree
23	Uncontrolled use of road transport has led to incessant price hike and hardship	1.34	2.85	2.10	Disagree
24	Implementation of global treaties will encourage facility development	1.38	2.79	2.09	Disagree
25	Industrial and urban development are functions of transport integration	2.91	2.68	2.80	Agree
26	Sectoral advocacy and relevant citizen education are key factors	2.72	3.05	2.89	Agree
27	Equitable land use policy for all modes will be encouraging	2.41	2.97	2.69	Agree
28	Private sector participation will ensure a mix of resources	2.55	2.70	2.63	Agree

urban cities where the use of road transport is predominant. Points if picking and discharging passengers is indiscriminate, repair works on vehicles are done in non-allocated places, junks from unused vehicles are dumped everywhere even as designated garages are in short supply. Unauthorized operational habits are brought into practice and crime rates are the attendant outcomes. This may be why it always seems the road transport (exceptionally) is synonymous with crimes and criminality, but in spite of these, all politicians, rulers, rich people in the society still see this group of people a ready tool for security or any act of intimidating

real or perceived enemies in a way that is brigandary. Equitable allocation of land and strict enforcement of land use laws will remove unnecessary space occupation provided for over-stretched passion for practice. This will also enshrine sanity, make monitoring/enforcement easier, environment cleaner and minimize societal criminality. Item 28 has been variously regarded as an issue that should be given its deserved attention. Having been saddled with the responsibilities of building and maintaining the transport infrastructural facilities, making and enforcing operational policy, matters of operational nature of transport modes should be handled by private

**Table 4.** Research question 4: How much effect will transport integration have on infrastructural development?

S/N	Items	N <sub>1</sub> = 12		N <sub>2</sub> = 82		Remarks
		X <sub>1</sub>	X <sub>2</sub>	X <sub>t</sub>		
29	Availability of all functional transport modes will encourage patronage.	2.62	2.71	2.67		Agree
30	Increase in patronage will necessitate facility upgrade and expansion.	1.42	2.83	2.13		Disagree
31	Provision of modern facilities will increase patronage and revenue.	2.58	2.87	2.73		Agree
32	Inter-modal financial buoyancy will necessitate acquisition of assets.	2.51	2.50	2.51		Agree
33	Government and private institutions are stakeholders due to operational enlargement.	2.73	2.91	2.82		Agree
34	Effective inter-modal co-ordination will reduce accidents.	1.65	1.89	1.77		disagree
35	Complementality of use will increase efficiency, safety and durability.	2.60	2.92	3.09		Agree
36	Investors' willingness is dependent on prospects.	3.25	2.92	3.09		Agree
37	Loyalty of patronage due to service efficiency will aid profitability.	2.49	2.73	2.61		Agree
38	Good returns on investments will expand modal sectors.	1.85	2.93	2.39		disagree
39	Actors in modal sectors will fare better in healthy competitions.	2.93	2.74	2.84		Agree
40	Other sectors will enjoy positive multiplier effects.	2.53	2.68	2.62		agree

sector, e.g. procurement of vehicles, boats, aircrafts, train engines/coaches, marketing/ticketing, maintenance should be the responsibilities of private sector with government standing as collateral for loan/bond/credit security. In Table 4, item 29, respondents were of the agreement that functional availability of all transport modes will bring necessary patronage especially this will suffice when safety, affordability are not comprised. The 30th item in (Table 4) is fallout from item 29. Thus, it was agreed that functional availability, safe and affordable will increase patronage. This agreement can be corroborated by the success of the Bus Rapid Transit (BRT) operations in Lagos even though the sub-sector is saturated. Facility expansion will ultimately result – consider the BRT lanes and other roads being necessitated for upgrading, expansion or new construction. Items 31 and 32 are fallouts of items 29 and 30. It was agreed that provision of modern transport facilities with some availability/affordability, revenue base will increase and more operational assets will need to be acquired. Consider the mass transit train service; the more patronage with the few available coaches, the higher the need becomes always to acquire more due to surging patronage. Some even sit on the roof of the coaches. Item 33 was agreed with, that government and private sectors are financial/operational stakeholders, especially when sectoral expansion is necessary. Business people know better to do business while government knows how better to make and implement policy. This synergy of involvement and inclusive participation will spread chain of belonging and responsibilities, thereby, reducing/eliminating sabotage, corruption, no-man business attitude and possible complacency. Item 34 was grossly disagreed with. This implies that effective inter-modal co-ordination will not reduce accidents. The word “will” here may be confusing. Purchase of equipment (vehicle, train/coaches, aircraft and boats) may be rightly done, routes may be fairly or wholly good, policy may be well implemented, but the human factor may not help in this regard (of accidents reduction) people are uniquely created by God, they reason and are affected differently and see life and situations differently.

These human factors may have informed the disagreement with this question item.

Complementality among the various modes will increase efficiency, safety and lives of facilities. This was the agreement in item 35. This implies that every mode of transport is made use in its peculiar area of need, haulage tankers will not dilapidate our “politically constructed roads” too soon, overbooking and congestion will not result in aircraft crashes, constant use will ensure functional and updated navigational equipment at both sea and airports, people will not risk their lives sitting down on train tops, commercial buses too, will not overload just because bus-stations are too congested and everyone wants to go, people/environment will be better for it, necessary funds will not be spent when each mode complements the service of the other. Item 36 agreed that investors' willingness was dependent on prospects. If one gives much to a cause, he also expects much to receive. More so, the motive of every business man/woman is “profitability”. If a sector is doing well especially in the area of “Rate of Return” (RR) or dividend bonus or payment, it is a positive indicator that gives investors' confidence to increase their stakes. Item 37 was agreed with that loyalty of patronage due to service efficiency will increase profitability. This is an economic truth. When demand is high with marketable products and supply is also high, the effect is good returns due to encouraging profitability. It was disagreed in item 38 that good Returns on Investment (ROI) will expand transport modal sectors, modal expansion may depend on passion and willingness of investors or other factors. An investor in area A may develop passion for area B or vice-versa. Other factors in operation in a particular mode may influence continued or reduced investment. When and where there is the absences of negative political influence, sectoral bigotry, biased treatment against one and in favor of the other, actors in each transport sector remain competitively healthy; this was the agreement in item 39. In item 40, it was agreed that other sectors of the economy will enjoy positive multiplier effects due to agreement with item 39. Transport is said to be a derived function. This derivation comes from other sector of the

economy. This implies that transport is the conveyor for the products of other sectors to reach the end, where they are needed. If therefore, the transport sector is not healthy due to modal problem, all other sectors from which transport derives its function are sure to be affected. For instance, when there was incessant aircraft crashes in Nigeria, people that usually travel by air resorted to other modes, especially road and scantily rail and waterways. Resultantly, fares went up, road accidents also increased and cost of living increased.

## DISCUSSION

A review of the analysis in (Tables 1-4), it is obvious that the Nigerian government on one side needs to do more than it is presently doing, in the appointment of people to positions of authority in the transport sector, needs to inject and monitor the use of more funds with the appointment of passionate and qualified people to run the affairs. On the other side, it was clearly agreed that power sharing strategy among the three tiers of government (federal, state and local) has not been done in a way that government policy will encourage the integration of transport modes for people's benefit. This corroborates Badejo, (2002) assertion that the practice in the transport sector in Nigeria has been duplicated in such a way that only (political) appointees and their cronies are laughing away. This he said, was not helped by the creation of ministries of transport and aviation where functions are duplicated and confused, more funds, more commissions of enquiry, more talks and less (visible/feasible) actions. The role played by the integration of transport modes were enumerated in (Table 2), except for item 11 where bulk good carriage with safety, efficiency and affordability were downplayed, but largely, issues of fair-pricing, better socio economic lives of riverine people through the use of inland waterways, total transports benefits, needs to genuinely resuscitate the rail transport to bring about competitive and affordable transport system were agreed on, that it will also bring about better revenue and healthier environment. Chartered institute of Transport Journal, (U.S. (1993) said, 'the heart of a nation's economy is in the health of its transport system, and this is determined by who (are the people) and what (the means) are put to it. In (Table 3), adequate funding need to pay concerted attention to rail transport, importance of transport integration to urban and industrial development, sectoral advocacy and citizens education on transport practices and private sector participation were all agreed with, items such as uncontrolled use of road transport leading to incessant price hike and facility development as a result of implementation of global treaties on transport were disagreed with. It could be said that global treaty implementation in this part of the globe can only manifest

through objective enforcement with total support from the ruling class.

Effect of modal integration in transport was focused on in (Table 4). Availability and patronage, facility provision enhancing customers base, financial prosperity leading to ability to increase asset base for operational purposes, consequent partnership between government and private sector, positive effect of complementarity (efficiency and safety) dependency of investors on prospects, effects of loyalty of patrons on profitability due to service efficiency, multiplier effects on the other sectors of the economy from which transport functions are derived were all agreed with in (Table 4). It was disagreed that effective inter-modal (integration) co-ordination will reduce accidents as well as issue of the good return on investment leading to the expansion of modal sectors. Ndikom, (2008) in her book, Human Psychology, saw each man as a unique being, whose characteristics and traits need to be closely studied, since there is definitely something distinguishing his behavior and decision from others. This human uniqueness could also be responsible for the two issues disagreed with above, accidents reduction due to integration. Integration is a concept, driving is an action that may result in an accident if adequate care fails to be taken or if there is mechanical, electrical, pneumatic, atmospheric, natural, road, air, water or rail problem. Hence, integration could be a means to an end. Investment decision by individuals is also personal and based on conviction, to do or not to do so.

## Recommendations

Based on the findings of this study, the following recommendations are made:

- (a) Government should as a matter urgent necessity revamp the transport sector through the appointment of passionate, qualified and willing professionals to run the affairs of the sector inject sufficient funds and monitor very closely, the conformity to, and execution of transport related projects.
- (b) In view of the global trends and domestic reality, transport policy should be reviewed with a view to strengthening the transport sector in line with modern technologies and best practices.
- (c) All and every action plan should be geared towards the resuscitation of all transport modes, road, rail, inland waterway and aviation to ensure meaningful integration of modes and complementarily.
- (d) Because of previous neglects that led to sectoral decay and sharp rise in transport cost, road spoilage, accidents and transport related crimes, rail transport ( as it was recurrently mentioned) should be given the attention it deserves for socio-economic, rural-urban regeneration and industrial development in Nigeria.

- (e) Private sector should be encouraged to participate meaningfully in the transport integration project to ensure both inter and intra- modal integration objectively.
- (f) Transport education should be included in our academic syllabus right from junior secondary school.
- (g) Government should create data base on transport and make it easy to obtain information for research and development in this all important sector.

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