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Factors Influencing Maritime Transportation and the Determinants of the Frequency of Incidents in Maritime Transportation in Selected States of the Southern Nigerian

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Abstract:

Background

The increasing maritime incidents and disasters that follow have become very worrisome to all stakeholders in the maritime industry particularly in the developing world where security and infrastructure is a challenge. The causes and consequent effects of disasters and incidents in the maritime sector are so numerous and challenging and statistics show that human error is to blame in over 70% of marine accidents. This study set out to evaluate the factors that influence maritime transport in the study area.

Method

The research design adopted is the survey design. Copies of structured questionnaire were administered to commuters and were administered using the systematic sampling technique. Pearson's product moment correlation coefficient (PPMC) and the multiple linear regression (MLR) were used for data analyses.

Result

Frequency of sea pirates attack occurrence in Anambra, Rivers, and Lagos states shows that it is monthly with 51.5%, (69.4%), (63.5%) respondents respectively. While in cross rivers and Ondo states sea pirate attacks takes place mostly quarterly with 58.7% and 54.9% respondents respectively. Also noted is that across the sampled states the marine regulations were not enforced. Correlation between perceived factors influencing maritime transport and frequency of accidents was significant at $p < 0.05$. The regression result shows that in the whole of the study area, accident cases are related to safety practices, factors of maritime transportation, safety awareness and safety hazard, at $P < 0.05$.

Conclusion

Conclusively the study advocates that, relevant authorities are to ensure provision of trained and armed Coastal Guards/Aquatic Lifesavers, Fire Wardens/Fighters, safety briefing halls for passengers and personal floatation device (PFD)/lifesaving appliances at Beaches and Jetties, for prevention of maritime accident and emergency response.

Keyword: Maritime-transport, determinants, incidents, southern-Nigerian

1. Introduction

The increasing maritime incidents and disasters have become very worrisome to all stakeholders in the maritime industry. The causes and consequent effects of disasters and incidents in the maritime sector are so numerous and challenging and statistics show that human error is to blame in over 70% of marine accidents (Julius, 2014). Similarly, the causes and the effect of maritime disasters such as poor education and training, inadequate policies and procedures, external factors like bad weather, Technical factors like unavailability of advanced equipment like Global Maritime Distress and Safety System (GMDSS), human factor and its effects such as financial loss to both, the ship owner and the nearby local communities is huge, loss of job, collision with an offshore structure or a port, leads to infrastructure damage and thus cause a heavy blow to human efforts among others. Therefore, proper implementation of the latest Standards of Training, Certification and Watch keeping for Seafarers (STCW) is important.

Udo (1970) noted that water is one of the natural resources which Nigeria has in abundance and that the country has the opportunity to service most landlocked countries in West Africa such as Burkina Faso, Chad, Mali and Niger. Also, Ilojie (2004) observed that Nigeria is richly endowed with surface water resources and that over 8000 kilometres of the inland waterways are navigable. Several other researchers such as Adetola (1971), Badejo (1995), Douglas (2001), Anyam

(2003), Ojile (2006), have written on various aspects of IWT in Nigeria such as its origin, advantages, neglect, management, problems and potentials. For instance, Badejo (1995), established that the Niger River, after which the country is named, and Benue, its largest tributary, are the main rivers whose channels provide the longest waterways into the hinterland of the country. Both rivers rise outside the country but meet at Lokoja confluence and later enter the Gulf of Guinea through a large network of creeks and distributaries which form the Niger Delta. They also noted that rapids and falls are common along many Nigerian rivers and that these are partly responsible for the fact that navigation is not possible along certain parts of these rivers (Adetola, 1971; Badejo; 1995; Douglas, 2001; Anyam; 2003; Ojile, 2006)

In another study, Wiegmann, et al., (2002) discovered that the capacity of Nigerian navigable waterways has increased to about 10,000 kilometres, plus an extensive coastline of about 852 kilometres. Based on this, they noted that the country has a huge potential to move goods and passengers from the coast to the hinterland by water. Also, Anyam (2003) regretted that the immense opportunities which the Nigerian inland waterways provide for business is yet to be tapped by potential investors. Wiegmann, et al., (2002) established that despite the huge potentials, inland water transport is yet to become an alternative means of transportation to road and air such that passengers and cargo can sustainably and efficiently be moved to their destination through water. Similarly, Ugbebor (2014) lamented that inland water transport is yet to receive the attention it deserves from the Federal Government, particularly in the twin areas of funding and infrastructural development. The researcher outlined the physical impediments to improved performance in the sector to include non-channelization and dredging of navigable rivers, inadequate construction and rehabilitation of river ports, limited water transported infrastructures (comfortable boats, jetties and buoys) and safety and security concern along the navigable waterways.

Ezenwaji (2010) focused on the poor use of inland rivers as transport routes in Nigeria & compared the percentage share of that transport mode to others in Nigeria and elsewhere and noted that in Bangladesh water transport constitutes 32% of the transport sector (Rahmam, 1994); 20% in Philippines (Fellinda, 2006); 3% in Sierra Leone (Kimba, 2008); 0.15% in India (Raphuram, 2004) and only 0.08% in Nigeria despite the country's rich endowment of inland waterways and some innovative initiatives introduced by the Nigerian Inland Waterways Authority (NIWA). Ezenwaji (2010) established, like earlier researchers (Aderemo and Mogaji, 2010), that several natural and human factors negatively affect the utilization of inland waterways as transport routes in Nigeria.

Akali and Idoko (2010), quoting Douglas, (2001) and Onuche, (2007) noted that inland water transportation plays a key role in the socio-economic and political development in Nigeria as a factor of exchange, mixing of population and sub-regional integration. They note that this mode of transport facilitates the movement of bulky goods over long and short distances and that it is better appreciated when the source and destinations are water front locations. They concluded by observing that in spite of the tremendous advantages associated with inland water transport, there has been a considerable decline in its use in Nigeria.

Obed, (2013) established that the viable opportunities which inland water transport offer to investors include facility management, jetty operations and boat building. Obed agreed with an earlier observation that security concerns discourage potential investors from tapping into the viable business opportunities, which the Nigerian IWT provides. There have also been several reports of consultancies by development agencies and firms, aspects of which have dealt with diverse IWT development issues such as river channels dredging and maintenance, private sector involvement in the water transport sector, construction and rehabilitations of river ports, acquisition of passenger ferries, security boats, building of channels buoys and other projects. The conclusions reached are that investment apathy on the part of investors and conflicts between federal and state agencies involved in supervising IWT in Nigeria are some of the factors limiting the development of Nigerian's IWT

Inland waterways are made up of navigable rivers, lakes, coastal creeks, lagoons and canals (Aderemo and Mogaji, 2010). The movement of goods and services along inland waterways is one of the oldest means of transporting goods and services (Fellinda, 2006). Inland water transport (IWT) offers the most economical, energy efficient and environmental friendly means of transporting all types of cargo from place to place (Ojile, 2006). It also offers safer and cheaper rates in areas where water exist naturally. The development of the sector facilitates commerce, promotes wealth creation, alleviates poverty, and creates job opportunities for youths within such regions. The ancillary sector of the boat building industry also generates employment through active engagement of the youths in welding and fabrication process (Gray, 2004).

From the above review, it is crystal clear that the spatial structure of inland water transport operations, its major contributions, socio-cultural constraints-limiting its operations and policy trusts and targets, remains largely unknown, hence the need for this study to bridge the existing gap.

2. Materials and Methods

This study is limited to selected coastal states in Nigeria including Anambra, Bayelsa, Cross River, Lagos, Ondo and Rivers States. Its coast line lies on the Gulf of Guinea in the southern part and it is bordered by Lake Chad in the north-eastern part, while on the western part it is bordered by Republic of Benin and Niger Republic on the North. Nigeria is situated geographically between longitude 3°E and 15°E, and latitude 4°N and 14°N (see figure 1).

The area is endowed with swamps (mangrove and fresh water) lagoon marshes, sand dunes, beach ridges and tidal channels. The climate is essentially the tropical type, which has its rainy season from April to November and dry season from December to March respectively (Efe, 2010).

Figure 1: Southern Nigeria Showing Study States

The research design adopted in this study is the survey design. The researcher employed a structured questionnaire which was administered to commuters of the inland waterways to assess their perception, regarding the subject matter. Primary data were sourced via the administration of copies of questionnaire on respondents in the study area. However, the target population for this study are commuters derived from house hold population of the catchment areas of the various jetties that dotted the study area. The justification for targeting this population is that the researchers felt that these populations are those who frequently use the inland water ways (Celik, & Cebi, 2009; Tzannatos, 2010; Progoulaki & Roe, 2011) located in the following states (Anambra, Bayelsa, Cross River, Lagos, Ondo and Rivers States) in Southern Nigeria, as such would also have first-hand information regarding the issues under review.

Furthermore, a population of four hundred and thirty-eight thousand, four hundred and eighty (438480) persons was the total population. Thereafter the Taro Yamane equation was then used to generate appropriate sample size for the study using equation 3.1 below

$$n = N / (1 + N(e^2)) \text{-----Equ 1}$$

where n = the sample size

N = the total population size

e = sampling error (in this case 0.05)

1 = constant

As a result, a total of 2375 sample size was realized. This implies that the sample was distributed across the sampled states as follows: Anambra state 393, Rivers state 398, Lagos state 399, Cross rivers state 395, Ondo state 392 and Bayelsa state 398. The reason behind the researchers sampling the states apart is that the researchers wanted to deal with states exclusively. Having achieved the delineation of the sample sizes the researcher then proportionally distributing the samples among the jetties.

The systematic sampling technique was then employed for gathering data for the study. Systematic sampling technique is a probability sampling method in which, sample numbers from a large population are selected according to a random starting point and a fixed sampling interval, in which case subjects has equal chance of being selected (Oyegun, 2003). Each individual in this study was sampled at an interval of every 5th commuter at the jetties; chosen systematically and entirely by precision, such that each individual has the same probability of being chosen at any stage during the sampling process, and each subset of k individuals has the same probability of being chosen for the sample as any other subset of k individuals.

The research instrument was subjected to face and content validation by experts in the field of marine research. This was necessitated by the need for the items on the instrument to measure what they are supposed to measure and do so consistently. In terms of the instrument's reliability, the Pearson's correlation coefficient was calculated on the scores of the respondents (20 boat users) who completed the questionnaire two times. The correlation coefficients varied across the sections and the boat user groups (ranging from 0.78 to 0.91). The overall reliability was high ($r=0.89$, $p<0.05$)

The data obtained via the questionnaire were presented in tables and statistical diagrams. However, for the purpose of data analyses, the Pearsons product moment correlation coefficient (PPMC) and the Multiple linear regression (MLR) were used. These were used to test the posited hypotheses. However, this was done in the environment of the statistical package for the social sciences (IBM/SPSS V 22)

3. Results

In table 1, the frequency of boat mishap occurrence in the study area is shown. In the table, for Anambra state, 3.8 % of the total respondents accented to the fact that boat mishap happens daily, 5.9% suggested that, boat mishap happens weekly, while on a monthly bases boat mishap happen for 54.1% of the period. In the same state 36.2% of the total respondents suggested that boat mishap occur quarterly. Furthermore, in Rivers state, only 0.5% of the total respondents adduced that boat mishap happens daily, while majority (69.9%) of the respondents suggested that boat mishap occurs monthly in the area.

State	Daily	Weekly	Monthly	Quarterly	Total
Anambra	15	23	211	141	390
Percentage (%)	3.8	5.9	54.1	36.2	100
Rivers	2	34	276	83	395
Percentage (%)	0.5	8.6	69.9	21	100
Lagos	12	19	261	103	395
Percentage (%)	3	4.8	66.1	26.1	100
Cross rivers	8	21	152	209	390
Percentage (%)	2.1	5.4	38.9	53.6	100
Ondo	6	24	146	214	390
Percentage (%)	1.6	6.1	37.4	54.9	100
Bayelsa	39	78	117	158	392
Percentage (%)	9.9	19.9	29.9	40.3	100

Table 1: Frequency of Boat Mishap Occurrence

Similar, situation exists in Lagos where the highest cases of boat mishap (66.1%) occur on monthly bases. In Cross rivers state, there seems to be more respondents (53.6%) in favour of the fact that boat mishap occurs more on a quarterly bases; same can be said for Ondo (54.9%) and Bayelsa (40.3%).

State	Daily	Weekly	Monthly	Quarterly	Total
Anambra	13	25	201	151	390
Percentage (%)	3.3	6.4	51.5	38.7	100
Rivers	6	30	274	85	395
Percentage (%)	1.5	7.6	69.4	21.5	100
Lagos	10	21	251	113	395
Percentage (%)	2.5	5.3	63.5	28.7	100
Cross rivers	7	22	132	229	390
Percentage (%)	1.8	5.6	33.9	58.7	100
Ondo	6	27	143	214	390
Percentage (%)	1.5	6.9	36.7	54.9	100
Bayelsa	41	80	107	164	392
Percentage (%)	10.5	20.4	27.3	41.9	100

Table 2: Frequency of Sea Pirates Attack

In table 2, the frequency of sea pirates attack occurrence in the study area is shown. In the table, for Anambra state, 3.3 % of the total respondents accented to the fact that sea pirates attack happens daily, 6.4% suggested that, sea pirates attack happens weekly; while on a monthly basis there are only 51.5%. In the same state 38.7% of the total respondents suggested that sea pirates attack occurs quarterly. Furthermore, in Rivers state, only 1.5% of the total respondents adduced that sea pirates attack happens daily, while majority (69.4%) of the respondents suggested that sea pirates attack occurs monthly in the area. Similar, situation exists in Lagos where the highest cases of sea pirate attack (63.5%) occur on monthly bases. In Cross rivers state, there seems to be more respondents (58.7%) in favour of the fact that sea pirate attacks occur more on a quarterly bases; same can be said for Ondo (54.9%) and Bayelsa (41.9%).

However, table 3, reveals the respondent's perception of the enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries and how they influence risk levels. In Anambra state 66.4% of the total respondents agree that the lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels, while 11.8% of the respondents disagree that lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels and 21.8% of respondents in Anambra state are undecided on the issue. The condition in Rivers state is not so different. In Rivers state, 74.7% of the total respondents agree that lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels. As low as 7.8% of the total respondents in Rivers state disagree that the lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels, while only 17.5% of the respondents in Rivers state were undecided about the issue.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	259	66.4	46	11.8	85	21.8	390	100
Rivers	295	74.7	31	7.8	69	17.5	395	100
Lagos	243	61.5	105	26.6	47	11.9	395	100
Cross rivers	232	59.5	35	9	123	31.5	390	100
Ondo	339	86.9	4	1	47	12.1	390	100
Bayelsa	346	88.3	21	5.3	25	6.4	392	100

Table 3: Lack of Enforcement of Laid Down Procedures as Required by National and International Maritime Laws by Authorized Agencies/Ministries Influence Risk Levels

In Lagos state 61.5% agreed that lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels, 26.6% of the respondents disagreed. Nonetheless, only 11.9% of the total respondents are undecided. In Cross Rivers state, 59.5% of the total respondents agreed that the lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels, although 9% disagrees with the assertion, while 31.5% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 86.9% of the total respondents agreed that the jetties in the state were poorly constructed, while 1% disagreed and only 12.1% of the total respondents were undecided. Finally in Bayelsa, 88.3% of the total respondents agreed that the lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels, 5.3% disagreed lack of enforcement of laid down procedures as required by national and international maritime laws by authorized agencies/ministries influence risk levels and 6.4% were undecided.

However, table 4 reveals the respondent's perception of the state of no training and retraining of both new and old marine workers on new technology in marine transport and how it influences risk levels. In Anambra state 65.6% of the total respondents agree that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, while 21.8% of the respondents disagree that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels and 12.6% of respondents in Anambra state are undecided on the issue. The condition in Rivers state is not so different. In Rivers state, 74.7% of the total respondents agree that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels. As low as 17.5% of the total respondents in Rivers state disagree that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, while only 7.8% of the respondents in Rivers state were undecided about the issue.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	256	65.6	85	21.8	49	12.6	390	100
Rivers	295	74.7	69	17.5	31	7.8	395	100
Lagos	240	60.8	108	27.3	47	11.9	395	100
Cross rivers	232	59.5	127	32.6	31	7.9	390	100
Ondo	339	86.9	47	12.1	4	1	390	100
Bayelsa	346	88.3	25	6.4	21	5.3	392	100

Table 4: No Training and Retraining of both New and Old Marine Workers on New Technology in Marine Transport Safety Influence Risk Levels

In Lagos state 60.8% agreed that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, 27.3% of the respondents disagreed. Nonetheless, only 11.9% of the total respondents are undecided. In Cross Rivers state, 59.5% of the total respondents agreed that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, although 32.6% disagrees with the assertion, while 7.9% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 86.9% of the total respondents agreed that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, while 21% disagreed and only 1% of the total respondents were undecided. Finally in Bayelsa, 88.3% of the total respondents agreed that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels, 6.4% disagreed that no training and retraining of both new and old marine workers on new technology in marine transport safety influence risk levels and 5.3% were undecided.

However, table 5 reveals the respondent's perception of how militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels. In Anambra state 67.7% of the total respondents agree that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, while 21% of the respondents disagree that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels and 11.3% of respondents in Anambra state are undecided on the issue. The condition in Rivers state is not so different. In Rivers state, 73.7% of the total respondents agrees that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels. As low as 18.2% of the total respondents in Rivers state disagree that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, while only 8.1% of the respondents in Rivers state were undecided about the issue.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	264	67.7	82	21	44	11.3	390	100
Rivers	291	73.7	72	18.2	32	8.1	395	100
Lagos	240	60.8	110	27.8	45	11.4	395	100
Cross rivers	231	59.2	122	31.3	37	9.5	390	100
Ondo	340	87.2	44	11.3	6	1.5	390	100
Bayelsa	300	76.5	65	16.6	27	6.9	392	100

Table 5: Militancy, Kidnapping, Sea Piracy and Use of Illicit Drugs by Some Marine Operators and Commuters Influence Risk Levels

In Lagos state 60.8% agreed that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, 27.8% of the respondents disagreed. Nonetheless, only 11.4% of the total respondents are undecided. In Cross Rivers state, 59.2% of the total respondents agreed that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, although 31.2% disagrees with the assertion, while 9.5% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 87.2% of the total respondents agreed that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, while 11.3% disagreed and only 1.5% of the total respondents were undecided. Finally, in Bayelsa, 76.5% of the total respondents agreed that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels, 16.6% disagreed that militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels and 6.9% were undecided.

However, table 6 reveals the respondent's perception of how industrial and domestic wastes disposal in marine environment influence risk levels. In Anambra state 64.4% of the total respondents agree that industrial and domestic wastes disposal in marine environment influence risk levels, while 23.8% of the respondents disagree that industrial and domestic wastes disposal in marine environment influence risk levels and 11.8% of respondents in Anambra state are undecided on the issue. The condition in Rivers state is not so different. In Rivers state, 73.7% of the total respondents agree that industrial and domestic wastes disposal in marine environment influence risk levels. As low as 18.7% of the total respondents in Rivers state disagree that industrial and domestic wastes disposal in marine environment influence risk levels, while only 8.1% of the respondents in Rivers state were undecided about the issue of how the industrial and domestic wastes disposal in marine environment influence risk levels.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	251	64.4	93	23.8	46	11.8	390	100
Rivers	291	73.7	74	18.7	32	8.1	395	100
Lagos	243	61.5	105	26.6	47	11.9	395	100
Cross rivers	232	59.5	123	31.5	35	9	390	100
Ondo	334	85.6	25	6.4	31	8	390	100
Bayelsa	346	88.2	25	6.4	21	5.4	392	100

Table 6: Industrial and Domestic Wastes Disposal in Marine Environment Influence Risk Levels

In Lagos state 61.5% agreed that industrial and domestic wastes disposal in marine environment influence risk levels, 26.6% of the respondents disagreed. Nonetheless, only 11.9% of the total respondents were undecided. In Cross Rivers state, 59.5% of the total respondents agreed that industrial and domestic wastes disposal in marine environment influence risk levels, although 31.5% disagreed with the assertion, while 9% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 85.6% of the total respondents agreed that industrial and domestic wastes disposal in marine environment influence risk levels, while 6.4% disagreed and only 8% of the total respondents were undecided. Finally, in Bayelsa, 88.2% of the total respondents agreed that industrial and domestic wastes disposal in marine environment influence risk levels, 6.4% disagreed and 5.4% were undecided.

However, table 7 reveals the respondent's perception of how inter-communal crisis between riverine/rural dwellers influence risk levels. In Anambra state 63.6% of the total respondents agreed that inter-communal crisis between riverine/rural dwellers influence risk levels, while 21.3% of the respondents disagreed and 15.1% of respondents in Anambra state were undecided on the issue of inter-communal crisis between riverine/rural dwellers influencing risk levels. The condition in Rivers state is not so different. In Rivers state, 54.4% of the total respondents agree that inter-communal crisis between riverine/rural dwellers influence risk levels. As low as 28.6% of the total respondents in Rivers state disagree that inter-communal crisis between riverine/rural dwellers influence risk levels, while only 17% of the respondents in Rivers state were undecided about the issue of inter-communal crisis between riverine/rural dwellers influencing risk levels.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	248	63.6	83	21.3	59	15.1	390	100
Rivers	215	54.4	113	28.6	67	17	395	100
Lagos	225	57	95	24	75	19	395	100
Cross rivers	258	66.2	131	33.5	1	0.3	390	100
Ondo	331	84.9	23	5.9	36	9.2	390	100
Bayelsa	359	91.6	14	3.6	19	4.8	392	100

Table 7: Inter-Communal Crisis between Riverine/Rural Dwellers Influence Risk Levels

In Lagos state 57% agreed that inter-communal crisis between riverine/rural dwellers influence risk levels, 24% of the respondents disagreed. Nonetheless, only 19% of the total respondents are undecided. In Cross Rivers state, 66.2% of the total respondents agreed that inter-communal crisis between riverine/rural dwellers influence risk levels, although 33.5% disagrees with the assertion, while 0.3% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 84.9% of the total respondents agreed that inter-communal crisis between riverine/rural dwellers influence risk levels, while 5.9% disagreed and only 9.2% of the total respondents were undecided. Finally, in Bayelsa, 91.6% of the total respondents agreed that inter-communal crisis between riverine/rural dwellers influence risk levels, 3.6% disagreed that inter-communal crisis between riverine/rural dwellers influence risk levels and 4.8% were undecided that inter-communal crisis between riverine/rural dwellers influences risk levels.

However, table 8 reveals the respondent's perception of the state of provision of security and safety for operators and commuters and how it influences risk levels along the waterways. In Anambra state 66.4% of the total respondents agreed that inadequate provision of security and safety for operators and commuters influence risk levels, while 21.3% of the respondents disagreed that, inadequate provision of security and safety for operators and commuters influence risk levels and 12.3% of respondents in Anambra state were undecided on the issue. The condition in Rivers state is not so different. In Rivers state, 74.7% of the total respondents agree that inadequate provision of security and safety for operators and commuters influence risk levels. As low as 17.5% of the total respondents in Rivers state disagreed that inadequate provision of security and safety for operators and commuters influence risk levels, while only 7.8% of the respondents in Rivers state were undecided about the issue.

State	Agree	%	Disagree	%	Undecided	%	Total	%
Anambra	259	66.4	83	21.3	48	12.3	390	100
Rivers	295	74.7	69	17.5	31	7.8	395	100
Lagos	243	61.5	105	26.6	47	11.9	395	100
Cross rivers	232	59.5	123	31.5	35	9	390	100
Ondo	339	86.9	47	12.1	4	1	390	100
Bayelsa	346	88.2	25	6.4	21	5.4	392	100

Table 8: Inadequate Provision of Security and Safety for Operators and Commuters Influence Risk Levels

In Lagos state 61.5% agreed that inadequate provision of security and safety for operators and commuters influence risk levels, 26.6% of the respondents disagreed. Nonetheless, only 11.9% of the total respondents were undecided. In Cross Rivers state, 59.5% of the total respondents agreed that inadequate provision of security and safety for operators and commuters influence risk levels, although 31.5% disagrees with the assertion, while 9% of the total respondents were undecided. In Ondo state, the condition is a bit worse, where 86.9% of the total respondents agreed that inadequate provision of security and safety for operators and commuters influence risk levels, while 12.1% disagreed and only 1% of the total respondents were undecided. Finally, in Bayelsa, 88.2% of the total respondents agreed that inadequate provision of security and safety for operators and commuters influence risk levels, 6.4% disagreed that inadequate provision of security and safety for operators and commuters influence risk levels and 5.4% were undecided.

S/N	Location	Relationship between	R	R2	Sig
1	Composite Model	PFIMT and FOI	0.722	0.521	.005
2	Anambra	PFIMT and FOI	0.761	0.580	.015
3	Bayelsa	PFIMT and FOI	0.801	0.642	.001
4	Cross-River	PFIMT and FOI	0.708	0.501	.002
5	Lagos	PFIMT and FOI	0.881	0.776	.012
6	Ondo	PFIMT and FOI	0.711	0.506	.010
7	Rivers	PFIMT and FOI	0.821	0.674	.000

Table 9: Correlation Results of the Factors Influencing Risk Levels in the Maritime Transportation Sector and the Frequency of Incidents in the Study Area
N.B: PFIMT Refer to Perceived Factors Influencing Maritime Transportation & FOI Refer to Frequency of Incidents

In table 9, the correlation between perceived factors influencing maritime transport and frequency of accidents is displayed. For the composite model (which is the whole study area), the model is significant at $p < 0.05$. Meaning that, there is a statistically significant relationship between factors influencing maritime transport and frequency of incidents in the study area. The correlation coefficient between the variables show a statistically high relationship ($r = 0.722$) the coefficient of determination (r^2) showed that 52.1% of the total variation in the frequency of incidents in maritime transportation in the study area is explained by variations in factors influencing risk levels in maritime transportation. Leaving the other 47.9% to other factors that determine maritime accidents such as, safety practice, faulty engines etc.

In Anambra state, a correlation value of 0.761 was realized. This signifies that relationship between perceived factor that influence maritime transport and the frequency of incidents in Anambra state, although only 58% of this relationship can be explained by the model. Leaving the other factors such as boat mishap, poor safety practices etc. also to be noted is that the model is significant at $p < 0.05$. This implies that there is a statistically significant relationship between the perceived factors that influence maritime transport and the frequency of incidents in Anambra state.

In Bayelsa state, a correlation value of 0.801 was realized which signifies that there is a strong relationship between factors of maritime transport and incident cases in the Bayelsa state. Although, the model can only explain 64.2% of the relationship, while leaving the other 35.8% to boat mishap, natural factors such as waves, sea surge etc. The model is also significant at $p < 0.05$ indicating that, there is a strong significant relationship between perceived factors of maritime transport and frequency of incidents in Bayelsa state.

In cross river state, there was a correlation value of 0.708 indicating a strong correlation between perceived factors of maritime transport and frequency of maritime incidents in the study area (cross-rivers state). Although, the model is able to explain 50.1% of this relationship, it is statistically significant at $p < 0.05$ indicating that there is a statistically significant relationship between the perceived factors of maritime transport and frequency of maritime incidents in Cross-rivers state. The same pattern of relationships also exists in Lagos ($r = 0.881$, $p < 0.05$) Ondo ($r = 0.711$, $p < 0.05$) and Rivers ($r = 0.674$; $p < 0.05$) states. This implies that there is a strong statistically significant relationship between the perceived factors of maritime transport and frequency of maritime incidents across the study area.

Variables	Multiple R	R square	Adjusted r square	F ratio Eqt	B	T val	sig
						45.4	.000
safety practice					.151	18.1	.000
FOMT (factors of maritime transportation)					-.015	-1.7	.086
safety awareness					.059	6.6	.000
Safety hazard	0.514	0.264	0.264	1044	.527	64.3	.000

Table 10: Multiple Regression Summary Table- Composite Model

In table 10, the regression result shows that in the whole of the study area, accident cases are related to safety practices, factors of maritime transportation, safety awareness and safety hazard, with an r value of 0.514; implying that as these factors increase, accident and incident cases also increases. The r^2 value of 0.264 indicates that the factors combined explain 26.4 percent of marine accident and incident cases in the study area, leaving the other 72.6 percent to natural factors, engine malfunction and human errors. The output of the model can be written thus: Y (incident and accident cases) = $37.866 + 0.15(X_1; \text{safety practice}) + 0.051(X_2; \text{factors of maritime transportation}) + 0.059(X_3; \text{safety awareness}) + 0.527(X_4; \text{safety hazards}) + 0.124$.

ANOVA ^b						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	77653.262	4	19413.315	1044.559	.000 ^a
	Residual	216127.000	11629	18.585		
	Total	293780.261	11633			

Table 11: ANOVA Model for the Regression Result

a. Predictors: (Constant), Safety_Hazards, Safety_Awareness, Safety_Practice, FOMT (Factors of Maritime Transportation)

b. Dependent Variable: Percieved_Incident_Accident_Cases

Table 11, shows that the regression model is statistically significant at $p < 0.05$; F 1044.559. Implying that maritime accidents and incidents significantly depends on Safety hazards, safety awareness, safety practice and FOMT (factors of maritime transportation).

4. Discussion

Generally, the perception of the respondents suggested that if no training and retraining of both new and old marine workers on new technology in marine transport safety, risk levels will rise. This is particularly true, since the technologies in the marine sector have continued to improve unabated. Aderemo&Mogaji, (2010) suggested that apart from other factors that influence risk levels in maritime transport such as militancy, kidnapping, sea piracy and use of illicit drugs, poorly trained marine workers may be more disastrous to the marine sector.

Furthermore, the study also found that, militancy, kidnapping, sea piracy and use of illicit drugs by some marine operators and commuters influence risk levels across the study area. This finding agrees with that of Theotokas, and Progoulaki, 2007; Hanzu-Pazara, Barsan, Arsenie, Chiotoriou&Raicu, (2008). These factors are particularly so for the obvious reasons. Firstly, the area is host to the crude oil reserves of the country. However due to neglect of the region by successive governments, the youths in the area have taken to militancy and crime as such it is common to find the militants scattered all around the water ways in the area. Secondly, the government of the day has not been so committed to the amnesty pact reached with the militants by previous government; therefore, some of the hitherto repented militants have gone back to militancy, thereby making the area's water ways more volatile.

Similarly, the study identified that, industrial and domestic wastes disposal in marine environment influence risk levels, so does inter-communal crisis between riverine/rural dwellers influence risk levels. According to Ezenwaji, 2010; Obed, 2013; these factors alone can run the maritime sector aground. Correlation model between perceived factors influencing maritime transport and frequency of accidents was significant at $p < 0.05$. As such those factors must be given critical look and addressed so as to reduce accidents on our water ways (Oyadongha, 2014). The regression result shows that in the whole of the study area, accident cases are related to safety practices, factors of maritime transportation, safety awareness and safety hazard.

5. Recommendations

Based on the findings of this study the following are recommended:

- Relevant authorities are to ensure provision of trained and armed Coastal Guards/Aquatic Lifesavers, Fire Wardens/Fighters, safety briefing halls for passengers and personal floatation device (PFD)/lifesaving appliances at Beaches and Jetties, for prevention of maritime accident and emergency response.
- Use of standard and routinely maintained boats to prevent accidents and break downs of shore.
- Provision of adequate route and traffic signs along the water ways to ease transportation and improve safety.
- Relevant authorities should ensure maritime safety laws are implemented and adhered to.
- Concessions of jetties to private sectors or investors are critical in developing our jetties and maritime transport system at this juncture.

6. Conclusion

This study investigated the factors influencing maritime transportation and the determinants of the frequency of incidents in maritime transportation in selected states of the southern Nigerian, and found out that the factors such as poor implementation of policies, poor waste management practice, sea pirate attacks and poor safety awareness are major factors influencing and affecting the maritime sector of the country. As a result, the study concludes that, if relevant authorities would apply the rules laid down by the international maritime organization, all these factors influencing the sectors performance would be eliminated.

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