
APPRAISING THE CRITERIA FOR CONTRACTORS' PREQUALIFICATION ON SELECTED PUBLIC TERTIARY EDUCATIONAL BUILDING PROJECTS IN SOUTHWESTERN NIGERIA

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Abstract

The success of any construction project is dependent on construction contractor to a great extent. Therefore, it is of paramount essence to select a qualified contractor in the execution of construction projects. This study aims at identifying the important criteria for selection of contractor which can be leveraged upon by the client in order to achieve successful building projects. With questionnaire survey adopted, the study recorded high response rate of 65%, out of 120 questionnaires administered on the respondents, above the usual trend of 20-30%. The questionnaire used and data collected were valid and reliable respectively. The Cronbach alpha values of reliability analysis range between 0.732 and 0.910. It was found that the major criteria for tertiary educational building (TEB) projects procured via open tendering route are bid amount and financial soundness while technical ability and management capability are for selective tendering arrangements. Regardless of the routes employed to actualize TEB projects, capital bid, financial status, experience, experience of technical personnel and client-contractor relationship are the most important sub-criteria for contractors' prequalification. The study recommends that not only construction client should give adequate cognizance to the aforementioned criteria but also the contractor during pursuit of better evaluation of bids technically and financially.

Keywords: Competitive tendering; prequalification criteria; procurement; prequalification; tertiary educational building projects.

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INTRODUCTION

Having a competent contractor is one of the indispensable conditions that cannot be overemphasized in order to achieve a proper process and completion of a construction project (Puri & Tiwari, 2014). This is indifferent to the construction projects procured via competitive tendering methods. It is generally acknowledged that the construction projects are becoming more complex in nature (Adedokun et al., 2013). This is without exception to the fact that the demands from clients are on the rising side while competitions have been growing rapidly (Seeley, 1997). Therefore, management of the construction projects must be in an effective manner (Puri & Tiwari, 2014). However, a failure to properly manage construction projects is tantamount to problems for the entire project and construction team. Alhazmi and McCaffer (2000) pointed out that chances of successful completion of construction projects could be enhanced through the selection of a proper construction contractor. With recourse to Alhazmi and McCaffer (2000), the assertion is valid and found to be true regardless of the procurement methods to be adopted for the construction projects. It is highly expedient to critically select an appropriate contractor in order to accomplish the client project goals while also keeping within the budgeted cost, time and quality devoid of surprises. The selection of the suitable contractor is undertaken during tendering and this places the client on a pedestal to award the contract to a tenderer that proposes the lowest price and short construction cycles (Puri & Tiwari, 2014).

Evidences abound in the construction management literature that the cheapest tenderers often have difficulties in delivering the project according to the conditions of contract. Absolute reliance or dependency on the lowest tender price is the basic cause of the project's non-performance in some cases. Based on the aforementioned, it is therefore expedient to properly evaluate the contractor's capabilities both financially and technically. This important decision is crucial for owners and project managers of public TEB projects because to a large extent, public construction projects are procured via competitive tendering/bidding in Nigeria due to procurement reform that paved way for due process. Therefore, the thrust of this paper tilted towards appraising the perceptions of key stakeholders on the criteria for contractors' prequalification on selected public TEB projects in Southwestern Nigeria. In order to achieve the aim of the study, the objectives set are to identify and assess the level of importance attached to the contractors' major and sub-prequalification criteria under competitive tendering routes (open and selective options). The study finally determines the

existence of significant differences or otherwise between each of the contractors major and sub-criteria for prequalification under open and selective methods of procurement.

LITERATURE REVIEW

Competitive bidding/tendering

Bidding is the act of offering to do something or to provide something: services or goods for a particular price as noted by Ade-Ojo (2009). Bidding is also a process by which the construction cost for a given construction work is determined. In the preparation of a bid, the estimated cost is adjusted by the addition of mark-up to cater for risks; overheads and profit (Harris & McCaffer, 1995), the assessment of these conditions vary from company to company. The difference in mark-up determines the bidding outcome and subsequently the survival, growth and profitability of the contracting organisation. Reviewing the works of Friedman and others, a bid is competitive enough as long as its mark-up is such that will qualify it for the award of the contract (Harris & McCaffer, 1995). The competitiveness of a bid i.e. the ability to win the contract and still at a profit depends on the level of accuracy of the estimate and the number of competitions involved.

Tendering methods

Ramus and Phil (2006) opines that the selection of a contractor to carry out a construction project is an important matter requiring careful thought in a project. The selection process itself is not an easy task as the decision may result in the success or failure of the entire project (Odusami, 1996). According to Online civil (2016), a wrong choice of the methods of contractor selection may lead to an unhappy client/contractor relationship which is tantamount to end up with dissatisfied client and sometimes even with an insolvent contractor. There are three major methods that are available for chosen a contractor to execute construction projects. The methods are open, selective and negotiated tendering but the major competitive methods include open and selective tendering (The Constructor n/d). The focus of this study is based on the Criteria for Contractors' Prequalification on Tertiary Educational Building (TEB) Projects procured under competitive tendering methods.

Open tendering method

Open tendering is the process of inviting tenderers/bidders to apply for tender documents and to tender in competition for carrying out the work through an advertisement in local newspapers and or technical press usually initiated by the client (Adedokun et al., 2013). According to Ayeni (1997), tendering is the process of making a submission by the contractor, for a construction project, when so desired by the client which could be an individual, private organisations, corporate bodies or even government agencies. In order to discourage frivolous applications, a sum of money is to be deposited (Online civil, 2016). The amount deposited is usually non-refundable and is also used in defraying the cost of producing the tender documents (Ayeni, 1997). In Nigeria, the basic situations where open tendering methods are used are on government or parastatal projects which are financed with public money; hence they are advertised and tendered for. Adewoyin (2010), Ngai, *et al* (2002), opine that open tendering system gives room for accountability and eliminates the charge of favoritism. Open tendering places all unknown contractors on the pedestal of becoming known, provides a wide range of selection which forces the price down (Chang & Ivy, 2002). The formation of ring or cartels among the contractors tendering are eliminated completely while also guarantees public accountability with an opportunity to get genuine and interested tenderers (Adedokun et al., 2013^b). On the other hand, Ramus (1981) asserts that the open tendering system increases the total cost of tendering as all tenderers would have to recoup their cost eventually through those tenders that are successful. The result can be an increase in the general level of construction costs. There is also the danger that the lowest tender may be submitted by a firm in-experienced in preparing tenders (particularly if bills of quantities are used) and whose tender is only lowest as a consequence of having made the most of the largest errors.

Selective tendering method

According to The Constructor (n/d), advertisement is made by the employer while also indicating selected list of contractors who will be invited to bid for the project. The list of information required to be supplied about the contractor are requested by the client in order to pre-qualify. Using this method, the client is at advantage because only contractors, with adequate experience; financially sound; and having the resources and skills to carry out the work, can be selected. Online civil (2016) opines that in selective tendering method, a shortlist is drawn up of contractors, from an approved list maintained by the client, who are adjudged to be suitable to execute the proposed work. The size of the proposed project determines the number of tenderers. Adewoyin (2010) suggests three or four contractors for a

small job while others may require up to six or more on larger jobs. In another studies, the number of tenderers should be limited to between five and eight (Ayeni, 1997; Ramus & Phil, 2006). Having ascertained that the firms on the list are all reputable, well established and suitable to undertake the proposed project, and then the resolution of the selection is made a function of the price only.

Prequalification

Waara and Brochner (2006) identified prequalification as the only possible way of protecting the capable and established firms with the client getting a more economical job. Prequalification is usually required for large or complex works like public projects. It ensures that invitation to bid is only given to the firms who have adequate capabilities and resources to execute the project (Gale, 2006). The effective implementation of competitive bidding is dependent on contractors prequalification as this serves to prevent fronting and window dressing. The different government circulars on the implementation of the due process certification, was summarized by Ezenwa (2004). Ezenwa (2004) pointed out that the call for prequalification is one of the major criteria for the certification of any public projects awarded. Going by the Inter-America Development Banks report (1997); prequalification depends on the "ability of the potential contractors to carry out the works in satisfactory manner". The criteria for prequalification included in the report are:

- Past experience and results in similar projects
- Contractors personnel and equipment available
- Financial capability of the contractor
- Other contracts presently being undertaken
- Any litigation or Arbitration from previous contracts in the last 5 years

RESEARCH METHOD

The study used existing methodology in Adoke (2017), Aje (2012) and Jiya (2012) in order to ensure the same basis/leveled ground for comparison. Survey method was adopted with primary data collected through structured questionnaires. The questionnaires were administered on the key professionals that actively participated in the completed TEB projects. The TEB projects were procured under open and selective competitive tendering methods. While tables were employed for data presentations, the analysis of the collected data was carried out using both the descriptive and inferential statistical tools. Percentiles was used in analyzing the demographics of respondents such as years of working experience, academic and professional qualifications while mean was not only used in determining the average years of working experience acquired by the respondents but also in ranking of items rated on a 5-point likert scale. Student T-test was employed in this study to determine the existence of either significant differences or otherwise for the hypotheses stated.

Research rigour

According to Yang and Wei (2010), reliability analysis is undertaken, prior to the ranking of factors, in order to ascertain the validity and reliability of the data collected. The reliability test is regarded as the consistency degree of the data collected (Aftab et al., 2010). The Cronbach α coefficient is a measure of the inner consistency (Kothari, 2009). Reliability is taken to be low when Cronbach α is less than 0.3 and it cannot be accepted while reliability is in high level when Cronbach α is greater than 0.7. In the occasion when Cronbach alpha is greater than 0.7, it shows that the inner consistency of indexes in the table is high level and it can be highly acceptable (Aftab et al., 2010). In furtherance to validating the questionnaire, the test of internal consistency was carried out using Cronbach's alpha. Cronbach's alpha is often considered a measure of item homogeneity where large alpha values indicate that the items are tapping a common domain (Wells & Pollack, 2003). The internal consistency of the measured attributes in this study as perceived among the respondents within the Likert scale (1 to 5) was explained by the reliability coefficient that is based on the average correlation among the attributes and the total number of attributes in the sample. Using the statistical Package for Social Sciences (SPSS), the Cronbach's alpha (α) was computed and presented in Table 1.

Table 1: Alpha Values for Reliability Analysis

Scale of measures	Competitive Tendering Methods		Nr of Items
	Open	Selective	
Overall constructs	0.784	0.769	30
Individual construct			
Major criteria for prequalification	0.811	0.841	6
Sub-criteria for prequalification	0.910	0.732	24

Table 1 shows reliability analysis for both major and sub-criteria for contractors' prequalification on TEB projects under competitive tendering methods. Results indicate Cronbach's Alpha values between 0.732 and 0.910 for the research instrument used for data collection in the study. The values are greater than 0.7 thresholds; therefore, based on Sushil and Verma (2010), the data collected with the instrument is acceptable while the instrument itself is reliable and valid.

DATA ANALYSIS AND PRESENTATION

Background information of the respondents to the survey

This shows that out of the One hundred and twenty (120) questionnaires administered on the respondents, 78 were filled, returned and found fit for the analysis. The analyzed questionnaire represented 65% of the total questionnaire sent out which is considered sufficient for the study (Oke & Ogunsemi, 2009).

Table 2: Demographics of the respondents

Category	Classification	Frequency	Percent
Profession Of Respondents	Quantity Surveying	18	23.08
	Architecture	15	19.23
	Building	9	11.54
	Engineering	36	46.15
	Total	78	100.00
Year Of Working Experience	1 – 5	5	6.41
	6 – 10	33	42.31
	11 – 15	20	25.64
	16 – 20	8	10.26
	21 – 25	6	7.69
	26 – 30	6	7.69
Mean	12.68	Total	78
Professional Membership Type	Probationer	18	23.08
	Corporate	60	76.92
	Fellow	0	0.00
	Total	78	100.00
Highest Academic Qualification Obtained	HND	7	8.97
	B.Sc/B.Tech/B.Eng	28	35.90
	Pgd	23	29.49
	M.Sc/ M.Tech	20	25.64
	PhD	0	0.00
	Total	78	100.00

From Table 2, majority of the respondents are Engineers having 46.15% i.e. 23.08%, 8.97% and 14.10% of Structural Engineers, Mechanical Engineers and Electrical Engineers respectively. 23.08% of the respondents are Quantity Surveyors while the Architects represented 19.23%.

Analysis of Table 2 reveals that the largest population of the respondents is B.Sc/B.Tech/B.Eng holder with 35.90% and closely followed by respondents with additional higher qualification of Postgraduate Diploma (PGD) representing 29.49%, while the third category has M.Sc. certificates as their highest qualification obtained with 25.64% and 8.97% having HND as highest qualification.

Regarding the years of working experience possessed by the respondents, it is evident that most of the respondents are within 6 – 10 years of experience being 42.31% of the total respondents. On the average, the respondents had an average of 13years working experience. Based on the foregoing, experience and the information supplied by these categories of professionals are considered adequate and reliable for this analysis.

Table 3: Importance of major criteria for contractors' prequalification

Major Criteria	Competitive Tendering Methods
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	Open		Selective	
	Mean	Rank	Mean	Rank
Bid Amount	4.38	1	3.32	6
Financial Soundness	4.10	2	3.86	3
Technical Ability	3.95	3	4.31	1
Management Capability	3.67	4	4.10	2
Health and Safety	3.38	5	3.44	4
Reputation	2.94	6	3.39	5
Average	3.74		3.74	

Table 3 shows the order of importance attached to the major criteria for prequalifying the contractors prior to undertaking TEB projects. Out of the six criteria identified from the literature, the top two, under open tendering, are bid amount (MS = 4.38) and financial soundness (MS = 4.10) while the reputation of the contractor is the least rated criteria based on the respondents' perceptions. Table 3 also reveals that the importance of technical ability (MS = 4.31) and management capability (MS = 4.10) cannot be overemphasized under selective tendering method of procuring TEB projects. Unlike TEB projects procured through open tendering, bid amount (MS = 3.32) is the least important contractors' prequalification criteria for TEB projects under selective tendering arrangement.

Table 4: T-Test on the major criteria for contractors' prequalification

	Open tendering	Selective tendering
Mean	3.74	3.74
Variance	0.0287	0.1715
Observations	6	6
Pooled variance	0.2215	
Hypothesized Mean Difference	0.0000	
Df	10	
t Stat	0.0000	
P(T<=t) one-tail	0.5000	
t Critical one-tail	1.8125	
P(T<=t) two-tail	1.0000	
t Critical two-tail	2.2281	

Regarding the level of importance attached to the major criteria for prequalifying the contractors using competitive tendering methods, the following hypothesis was tested:

Null Hypothesis (H₀): there is no significant difference between the major criteria for prequalifying contractors using open and selective tendering methods.

Alternative Hypothesis (H₁): there is significant difference between the major criteria for prequalifying contractors using open and selective tendering methods.

Decision: Based on the analysis carried out as reflected in table 4, T-critical < t-cal (P-value > 0.05, two-tail), therefore the null hypothesis is accepted, that there is no significant difference between the major criteria for contractors' prequalification using open and selective tendering arrangement.

Table 5: Premium placed on the sub-criteria for contractors' prequalification

Sub Criteria	Competitive Tendering Methods			
	Open		Selective	
	Mean	Rank	Mean	Rank
Bid Amount				
Capital bid	4.00	1	3.44	1
Major repairs	3.24	2	2.64	2
Advance payment	3.04	3	2.64	2
Routine maintenance	3.00	4	2.52	4
Average	3.32		2.81	
Financial Soundness				
Financial status	4.16	1	3.56	1
Financial stability	3.92	2	3.32	2
Credit rating	3.72	3	3.28	3
Bank arrangement	3.64	4	3.16	4
Average	3.86		3.33	
Technical ability				

Experience	4.52	1	3.60	1
Personnel	4.32	2	3.40	4
Ability	4.28	3	3.48	2
Plant and equipment	4.12	4	3.44	3
Average	4.31		3.48	
Management capability				
Experience of technical personnel	4.40	1	3.60	1
Past performance	4.12	2	3.60	1
Management organization	3.96	3	3.28	4
Management knowledge	3.92	4	3.32	3
Average	4.10		3.45	
Health and safety				
Safety	3.84	1	2.76	3
Management safety	3.48	2	2.80	1
Experience modification rate (EMR)	3.32	3	2.80	1
Occupational safety and housing administration (OSHA)	3.12	4	2.76	3
Average	3.44		2.78	
Reputation				
Client-contractor relationship	4.00	1	3.12	1
Number of past failures	3.48	2	2.84	2
Length of time in business	3.48	2	2.84	2
Other relations	2.60	4	2.08	4
Average	3.39		2.72	

Table 5 indicates the premium placed on the sub-criteria for contractors prequalification during open and selective tendering methods of procuring tertiary educational building projects. For building projects procured via open tendering route, the sub-criteria for the contractors' prequalification were rated based on descending order of means. Capital bid (MS = 4.00), financial status (MS = 4.16) and experience (MS = 4.52) are the sub-criteria for prequalifying contractors that the respondents placed high premium upon, being the first rated, under each of major criteria of bid amount, financial soundness and technical ability respectively. Others under major criteria of management capability, health & safety and reputation include experience of technical personnel (MS = 4.40), safety (MS = 3.84) and client-contractor relationship (MS = 4.00) respectively.

With recourse to the building projects that were procured via selective tendering route, the respondents preferred capital bid (MS = 3.44), financial status (MS = 3.56) and experience (MS = 3.60) as important sub-criteria for contractors prequalification to be reckoned with, being major criteria, under bid amount, financial soundness and technical ability respectively. Regardless of the procurement routes under competitive tendering, the sub-criteria with highest premium tied in both instances. The sub-criteria under the remaining three major criteria of management capability, health & safety and reputation are experience of technical personnel and past performance that tied (MS = 3.60), management safety and experience modification rate (EMR) also tied (MS = 2.80) and client-contractor relationship (MS = 3.12) respectively. On the average, none of the groups of the sub-criteria is below 2.50 as shown in Table 5 with the least being 3.32 and 2.72 under open and selective route of procuring TEB projects.

Table 6: T-Test on the sub-criteria for contractors' prequalification

	<i>Open tendering</i>	<i>Selective tendering</i>
Mean	3.7367	3.0950
Variance	0.2503	0.1712
Observations	24	24
Pooled variance	0.2108	
Hypothesized Mean Difference	0.0000	
Df	46	
t Stat	4.8418	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6787	
P(T<=t) two-tail	0.0000	
t Critical two-tail	2.0129	

Regarding the level of importance attached to the sub-criteria for prequalifying the contractors using competitive tendering methods, the following hypothesis was tested:

Null Hypothesis (H₀): there is no significant difference between the sub-criteria for prequalifying contractors using open and selective tendering methods.

Alternative Hypothesis (H₁): there is significant difference between the sub-criteria for prequalifying contractors using open and selective tendering methods.

Decision: Based on the analysis carried out in table 6, $T\text{-critical} < t\text{-cal}$ ($P\text{-value} < 0.05$, two-tail), therefore the null hypothesis is rejected and the alternative hypothesis, which states that there is significant difference between the sub-criteria for prequalifying contractors using open and selective tendering systems, is accepted.

Discussion of findings

The discussions are based on the results from the analyzed data, as obtained from the triangulation of distributed questionnaires, personal contacts and literature. Relationships are drawn between the observed information through the analysis and past studies similar to this study so as to examine the agreement or otherwise between the present and the past studies while contributing to the body of knowledge.

Importance of major criteria for contractors' prequalification

Considering the importance of major criteria for contractors' prequalification, the top two under open tendering route for procuring TEB projects are bid amount and financial soundness as shown in Table 3. This finding corroborates Chang and Ivy (2002) which states that open tendering provides a wide range of selection which forces the price down as a result of the competition between the contractors tendering. The finding is also in tandem with studies undertaken by Aje (2012) and Jiya (2012) where technical capacity and financial capacity were the top two criteria. Adoke (2017) and Pouy (2011) also recorded a similar trend that financial capability/consideration is the main key factor for contractors' prequalification criteria among others while also noting that price is found to be important in building/housing projects.

For TEB projects undertaken via selective tendering method, as revealed in Table 3, the importance of technical ability and management capability cannot be overemphasized. The present study is in consonance with Online civil (2016) that the essence of selective tendering in project procurement is to draw up a shortlist of tenderers who are considered to be suitable and well established to execute the proposed work. While the constructor (n/d) opines that the selection criteria are based on adequate experience with resources and skills to undertake the work; Adedokun et al. (2016) establish that past performance, technical ability, and management capability impacted on project cost performance. Despite the fact bid amount is the least important criteria yet the final selection is resolved into a question of price/cost only (Online civil, 2016; Puri and Tiwari, 2014).

Premium placed on the sub-criteria for contractors' prequalification

Regarding the building projects procured via open tendering route, the sub-criteria for the contractors' prequalification with high premium are capital bid, financial status, experience, experience of technical personnel, safety and client-contractor relationship. The aforementioned sub-criteria are at variance with host of other studies as depicted in Table 5. Adoke (2017) put forward financial stability, contractors' experience and ability, past performance & quality achieved, safety records, past performance of the contractors in the previous invitations, tax/vat certificate as the most important sub-criteria while Nkanta, et al. (2017) advocated for performance on previous project, experience of the contractor, evidence of incorporation of business registration, experience of technical personnel, experience of the geographical location of the project. The variability experienced might be due to the difference in the study location and the methods adopted during the procurement of the projects.

Capital bid, financial status, experience, experience of technical personnel and past performance, management safety and experience modification rate (EMR) and client-contractor relationship are the important sub-criteria that high premium are placed upon for the contractors' prequalification. The sub-criteria highlighted are meant for the building projects procured through selective tendering route. It is also noteworthy to reiterate that the most highly rated sub-criteria, under each of the major criteria, tied under the both competitive tendering routes except for health and safety. Based on the foregoing, it is also evident that the present study is not in congruence with the earlier studies undertaken by Adoke (2017) and Nkanta, et al. (2017) as previously stated above. The divergence witnessed might not be unconnected to the difference in the study location and the methods adopted during the procurement of the projects cum the variables included in the instrument for data collection.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Following the findings from the study, it was concluded that on TEB projects procured via open tendering route, bid amount and financial soundness were accorded high importance while in relation to TEB projects undertaken through selective tendering arrangement, technical ability and management capability cannot be overemphasized as important criteria. Based on the perceptions of the key stakeholders involved in the execution of these projects, the top two major criteria were under each of the competitive tendering methods differ yet when tested statistically, there was no significant difference between the major criteria irrespective of the competitive tendering options adopted. This is also evidenced in their mean values. The most highly important sub-criteria, for TEB projects undertaken through open tendering arrangement, are capital bid, financial status and experience for each of bid amount, financial soundness and technical ability respectively. Others under management capability, health & safety and reputation included experience of technical personnel, safety and client-contractor relationship respectively. With recourse to the building projects that were procured via selective tendering route, the sub-criteria preferred are capital bid, financial status and experience under the major criteria of bid amount, financial soundness and technical ability respectively. Regardless of the procurement routes under competitive tendering, the sub-criteria with highest premium tied in both instances. The sub-criteria under the remaining three major criteria of management capability, health & safety and reputation are experience of technical personnel and past performance, management safety and experience modification rate (EMR), and client-contractor relationship respectively. On the average, none of the groups of the sub-criteria is below 2.50 as shown in Table 5 with the least being 3.32 and 2.72 under open and selective route of procuring TEB projects. Based on the T-test analysis undertaken, it is evident that there is significant difference between the sub-criteria for prequalifying the contractors using open and selective tendering systems. This is also reflected in their mean values.

Recommendations

Sequel to the conclusions drawn from the findings in this study, the following recommendations are provided to acquaint the construction contractors with firsthand information on the major and sub-criteria that are considered during contractors' prequalification exercise towards pursuit of better evaluation of bids both technically and financially. On the part of construction clients, the recommendations in this study will also identify the criteria for selection of the contractors which can be leveraged upon by the client in order to achieve successful projects. In any TEB projects to be procured via open tendering route, emphasis should be placed on bid amount and financial soundness while technical ability and management capability should not be undermined during TEB projects to be undertaken through selective tendering arrangement. Considering the sub-criteria for prequalification of contractors' during TEB projects via open tendering arrangement, high premium should be accorded capital bid, financial status, experience, experience of technical personnel, safety and client-contractor relationship. With recourse to the building projects via selective tendering route, capital bid, financial status, experience, experience of technical personnel and past performance, management safety and experience modification rate (EMR), and client-contractor relationship are germane and highly important to be given adequate cognizance.

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