

Maintenance Generators and Procurement Methods of Sport Facilities in the North Central Nigeria

Hilary Omatule Onubi¹, Isa Hassan-Enua Mshelgaru¹ & Stanley Mhya Andrew¹

¹ Department of Building, Ahmadu Bello University Zaria, Kaduna State, Nigeria

Correspondence: Hilary Omatule Onubi, Department of Building, Ahmadu Bello University Zaria, Kaduna State, Nigeria. Tel: 234-803-423-1108. E-mail: onubihilary@gmail.com

Received: December 1, 2014

Accepted: February 6, 2015

Online Published: October 8, 2015

doi:10.5539/emr.v4n2p21

URL: <http://dx.doi.org/10.5539/emr.v4n2p21>

Abstract

This study assessed the factors affecting maintenance of the various elements of both indoor and outdoor sports facilities as well as the methods used in of maintaining them. Twenty questionnaires were administered to managers and maintenance officers of the sports facilities in the North Central Nigeria. Relevant factors which were peculiar to each of the facilities were obtained from related literatures and validated. The respondents assessed the effects of the factors on the maintenance of the various facilities. Also, the respondent's opinion was sort on issues relating to methods used for procurement of maintenance works for the sport facilities, and whether there are variations in efficiency of the facilities based on the procurement methods adopted. The results obtained were analyzed using the Relative Importance Index (RII) and simple percentages. RII was used to determine the degree of significance of each factor and how significantly each element of the sport facility is either being insourced or outsourced. From the results, the effect of the factors on the maintenance of the facilities ranged from "not significant" to "very significant", depending on the facilities in question. The procurement methods used for maintenance works was mostly a combination of insourcing and outsourcing. It was observed that variations exist in the efficiency of maintenance depending on the method of procurement adopted too. It was recommended that more attention be given to the factors affecting maintenance rather than of attempting to address both at the same time. Also it was recommended that the method of procurement of maintenance works should be dependent on the competencies of the in-house staff available and not by taking such decisions without taking into considerations the capabilities present in-house.

Keywords: insourcing, maintenance, outsourcing, procurement methods, sport facilities

1. Introduction

Sports perform social, cultural, economic and political functions in every society (Cavalli, 2009) and refers to any physical activity that is highly organized within definite boundaries of a standard facility, with its equipment and specified rules and regulations made by professional bodies which every participant adheres to (Orunaboka & Nwachukwu, 2012).

Sports facilities are categorized as hospitality facilities and the facilities require high level of services and attention because their expectation is usually high (Lee & Scott, 2009). According to Chan et al. (2001), hospitality facilities are more complicated in construction and installation, thus it leads to higher maintenance cost. These types of facilities are of similar nature to hotels facilities and are categorized as "dynamic" hospitality facilities. The maintenance requirements here are comparatively more demanding. Therefore it is important to have a well-developed maintenance practice to support the maintenance of these facilities (Lee & Scott, 2009).

According to the British Standard 3811, "building maintenance" is defined as the work undertaken to keep, restore or improve every part of a building, its services and surroundings. Lee and Scott (2009), used this definition to define the maintenance of sports facilities as well. Maintenance of sports facilities is expected to restore the facility to its original design level and not to fall below the acceptable performance level (Natural turf, 2008) and it may be more than "to extend the life cycle of the facility" (Zavadskas et al., 1998).

Sports facilities can be categorized according to size and standard into three namely; international standard, local standard and miniature. The categorization is based on compliance with certain laid down requirements of the governing bodies of the various sports organisations (Westerbeek et al., 2005).

Maintenance is necessary even if a facility is large, small, simple or complex. However, it is suggested to have maintenance-free facilities or adapt approaches with deferred maintenance strategy (El-Haram & Horner, 2002; Wood, 2003). Over the past years, sports facilities maintenance has been given a very low priority and the facilities maintenance performance has been criticized as inefficient and unsatisfactory (Lam, 2000). Sport facilities when constructed or provided, they meet the required global standards and however nothing is done subsequently regarding the maintenance and management of the facilities at the early stages of their lives (Rover, 2009). The poor maintenance culture results to loss of value in investment and eventually increasing the cost of restoring the facilities to their initial state of soundness and good working order (Keith, 2009). Although, maintenance is apparently a technical operation, it requires integration of different technical and managerial inputs from planning to implementation of activities in order to effectively manage such dynamic hospitality facilities (Coetzee, 1999; Wood, 1999; Alani et al., 2002; Tse, 2002).

This research seeks to assess the factors affecting the maintenance of sports facilities in north central Nigeria with a view to recommending ways with which the facilities can be better maintained.

2. Methodology

The survey was designed and conducted in a descriptive manner. For data collection and meeting up with the research objectives, inventory sheets (checklist) and articulated framed questionnaires were used. The first section of the questionnaire focused on the various factors that cause maintenance in each of the sport facilities studied, while the second section focused on the procurement methods for maintaining them. Twenty (20) questionnaires were administered to the management staff and maintenance officers of the various sport facilities, all where returned filled which represents a 100% response rate. The survey covered 10 sports facilities in North Central Nigeria, comprising stadia and institutions of higher learning that housed a large pool of sport facilities that meet local and international standards.

Simple percentages and Relative Importance Index (RII) were used to analyze the data obtained. The various factors assessed were ranked based on their order of relative importance on a likert scale of 1 to 5. The respondents were asked to rank the factors affecting maintenance of sports facilities according to their degree of importance; where 1=not a factor; 2=low effect; 3=moderate effect; 4=high effect; 5=extreme effect. While the second section of the questionnaire identifies the method of procurement adopted for the various elements of the sport facilities, where the respondents were required to indicate the effect, if any, the method of procurement of has on maintaining the sport facilities and also rank the rate at which the various elements of the facilities are either being insourced or outsourced, where 1=low; 2=relatively low; 3=moderate; 4=relatively high; 5=high. Procurement is topical among the factors affecting maintenance of all the sport facilities (Adenuga & Dosumu, 2012), and as such, it is treated separately in this study.

The relative importance index (RII) is given in the equation;

$$\text{Relative Importance Index (RII)} = \frac{\sum fx}{\sum f} \times \frac{1}{K}$$

Where,

$\sum fx$ =is the total weight given to each attributes by the respondents.

$\sum f$ =is the total number or respondents in the sample.

K=is the highest weight on the likert scale.

Ranking of the items under consideration was based on their RII values. The item with the highest RII value is ranked first (1st) the next second (2nd) and so on. The rating of all the factors for degree of significance was based on the respective relative importance index (RII) value. The guide for the rating is 0.76 and above is very significant; 0.67-0.75 is significant; 0.45-0.66 is fairly significant; while 0.44 below is rated not significant.

3. Results and Discussions

3.1 Factors Contributors to Maintenance of Sport Facilities

Table 1. Contributors to maintenance of football/cricket pitches

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of use and level of play	-	10	9	-	1	20	52	2.60	0.52	10 th
2.	Multi-Sport Uses	4	4	4	4	4	20	60	3.00	0.60	6 th
3.	Weather and climates	1	4	11	4	-	20	58	2.90	0.58	8 th
4.	Soil and terrains	13	3	2	1	-	20	27	1.35	0.27	11 th
5.	Availability of Water & irrigation systems	-	3	14	2	1	20	61	3.05	0.61	5 th
6.	Budgets	-	3		9	2	20	70	3.50	0.70	3 rd
7.	Owner's goals	-	8		4	1	20	57	2.85	0.57	9 th
8.	Type and quality of pitch constructions	-	6		1	2	20	59	2.95	0.59	7 th
9.	Pitch securities (trespassing)	-	1		13	2	20	71	3.55	0.71	2 nd
10.	Availability of Personnel	1	2	8	6	3	20	68	3.40	0.68	4 th
11.	Type of footwears	-	1	6	12	1	20	73	3.65	0.73	1 st

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 1 shows the factors that brings about need for maintenance of football/cricket pitches. Type of footwears ranked first among the factors. Pitch securities (trespassing), budgets, availability of personnel are significant factors that ranked second, third and fourth respectively. Availability of water and irrigation system, multi-sport use, type and quality of pitch construction, weather and climates, owners goal, amount of use and level of play ranked fifth, sixth, seventh, eighth, ninth and tenth respectively and are all fairly significant factors that brings about the need for maintenance to these sport facilities. However, the least ranked factor is soil and terrain which ranked eleventh and it is not a significant factor.

Table 2. Contributors to Maintenance of swimming pools

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Acquisition of technicians	-	-	12	8	-	20	68	3.40	0.68	7 th
2.	Number of clients to be served	-	-	10	7	3	20	73	3.65	0.73	6 th
3.	Amount and kinds of equipment needed	-	-	3	13	4	20	81	4.05	0.81	2 nd
4.	Types of clients to be served	-	-	2	12	6	20	84	4.20	0.84	1 st
5.	Availability of personnel to carryout maintenance works	-	-	8	10	2	20	74	3.70	0.74	5 th
6.	Owner's goals	-	-	4	12	4	20	80	4.00	0.8	3 rd
7.	Weather and climates	-	-	8	9	3	20	75	3.75	0.75	4 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 2 shows the factors that necessitates the need for the maintenance of swimming pools. Types of clients ranked first, followed by amount and kinds of equipment needed, and owner's goals which are all very significant factors in the maintenance of swimming pools. Weather and climate, availability of personnel to carryout maintenance works, number of clients to be served and Acquisition of technicians are all significant factors ranking fourth, fifth, sixth and seventh respectively.

Table 3. Contributors to maintenance of badminton courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of use and level of play	-	-	12	8	-	20	68	3.40	0.68	5 th
2.	Type of court surfaces	-	4	6	10	-	20	66	3.30	0.66	6 th
3.	Weather and climates	-	-	8	12	-	20	72	3.60	0.72	2 nd
4.	Locations of the court(indoor or outdoor)	-	-	4	13	3	20	79	3.95	0.79	1 st
5.	Budgets	-	3	5	10	2	20	71	3.55	0.71	3 rd
6.	Owner's goals	1	5	3	9	2	20	66	3.30	0.66	6 th
7.	Type and quality of courts	-	-	7	11	2	20	69	3.45	0.69	4 th
8.	Court securities	-	-	14	2	-	20	58	2.90	0.58	9 th
9.	Availability of Personnel	-	5	10	4	1	20	61	3.05	0.61	8 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

From Table 3, the highest ranked factor that contributes to maintenance is locations of the courts which is very significant factor. Weather and climates, Budgets, types and quality of courts, and amount of use and level of play are all significant factors ranking second, third, fourth and fifth respectively. Owner's goals, types of court surfaces, availability of personnel and court securities are fairly significant factors ranked sixth, eighth and ninth respectively.

Table 4. Contributors to maintenance of gymnasium

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Type of equipment in the gym	-	-	4	12	4	20	80	4.00	0.8	2 nd
2.	Frequency of uses	-	1	11	6	2	20	69	3.45	0.69	5 th
3.	Weather and climates	2	7	9	2	-	20	51	2.55	0.51	10 th
4.	Unauthorized usage	-	1	6	8	5	20	77	3.85	0.77	4 th
5.	Budgets	-	-	4	13	3	20	79	3.95	0.79	3 rd
6.	Owner's goals	-	6	4	7	3	20	67	3.35	0.67	7 th
7.	Unavailability of technicians	-	-	3	13	4	20	81	4.05	0.81	1 st
8.	Gym securities	-	5	7	6	2	20	65	3.25	0.65	8 th
9.	Availability of personnel	-	1	10	7	2	20	69	3.45	0.69	5 th
10.	Volume of traffic	2	12	3	3	-	20	47	2.35	0.47	11 th
11.	Concentration of people at particular points in the gymnasium	1	8	7	4	-	20	54	2.70	0.54	9 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 4 shows the factors that contributes to the need for maintenance of gymnasias. Unavailability of technicians ranked first and should be given more attention if a high degree of maintenance is to be achieved. Type of equipment in the gymnasias, budgets, and unauthorized usage are highly significant factors that ranked second, third and fourth respectively and are all contributors to maintenance. Frequency of use, availability of personnel, and owners goals are significant factors and their degree of importance are in descending order in which they are mentioned. Gymnasias securities, concentration of people at particular points in the gymnasium, weather and climates, and volume of traffic are fairly significant factors ranked accordingly as mentioned in descending order of importance.

Table 5. Contributors to maintenance of tertan athletics tracks

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Traffic/number of events	-	2	12	3	3	20	67	3.35	0.67	15 th
2.	Frequency of use	-	1	2	13	4	20	80	4.00	0.8	1 st
3.	Weather and climates	-	3	4	8	5	20	75	3.75	0.75	8 th
4.	Unauthorized usage	1	1	6	7	5	20	74	3.70	0.74	10 th
5.	Budgets	2	1	3	12	2	20	71	3.55	0.71	12 th
6.	Owner's goals	-	-	9	4	7	20	78	3.90	0.78	3 rd
7.	Availability of technicians	-	1	2	15	2	20	78	3.90	0.78	3 rd
8.	Track securities	-	2	3	11	4	20	77	3.85	0.77	6 th
9.	Availability of other personnel	1	2	4	10	3	20	72	3.60	0.72	11 th
10.	Volume of traffics	2	3	4	7	4	20	68	3.40	0.68	14 th
11.	Size of surfaces	2	1	8	2	7	20	71	3.55	0.71	12 th
12.	Resources and equipment dedicated to cleaning surfaces	-	5	7	6	2	20	65	3.25	0.65	16 th
13.	Availability of maintenance equipment	-	2	6	7	5	20	75	3.75	0.75	8 th
14.	Availability of trained and skilled personnel	-	-	7	10	3	20	76	3.80	0.76	7 th
15.	Movement of rolling and static loads along or across the tracks	9	5	4	2	-	20	35	1.75	0.35	18 th
16.	Use of pin spikes and needle spikes	-	-	2	16	2	20	80	4.00	0.8	1 st
17.	Clogged drainage systems	2	4	4	8	2	20	64	3.20	0.64	17 th
18.	Condition of other nearby grassed areas	-	-	4	14	2	20	78	3.90	0.78	3 rd

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

From Table 5, Use of pin spikes and needle spikes, Frequency of use, Owner's goals, Availability of technicians, Condition of other nearby grassed areas, Track securities, Availability of trained and skilled personnel are very significant factors that necessitates the maintenance of an Athletics track. Factors that ranked from eight to fifteen Availability of maintenance equipment, Weather and climates, unauthorized usage, Availability of other Personnel, Budgets, Size of surfaces, Volume of traffics, and Traffic/number of events are significant factors, Resources and equipment dedicated to cleaning surfaces and clogged drainage systems are fairly significant factors. Movement of rolling and static loads along or across the tracks is not significant in causing maintenance.

Table 6. Contributors to maintenance of fives courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of uses and level of plays	-	-	7	9	4	20	77	3.85	0.77	6 th
2.	Multi-sport uses	-	-	6	9	5	20	79	3.95	0.79	3 rd
3.	Weather and climates	-	-	8	2	10	20	82	4.10	0.82	2 nd
4.	Soil and terrains	-	-	9	4	7	20	78	3.90	0.78	4 th
5.	Budgets	-	-	5	12	3	20	78	3.90	0.78	4 th
6.	Owner's goals	-	-	11	4	5	20	74	3.70	0.74	7 th
7.	Types and quality of court constructions	-	-	4	6	10	20	86	4.30	0.86	1 st
8.	Nature of footwears	-	6	3	7	4	20	69	3.45	0.69	9 th
9.	Availability of Personnel	-	2	9	4	5	20	72	3.60	0.72	8 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 6 shows the contributors to maintenance of a fives courts. The factors are ranked according to their order of importance from first to tenth depending on their RII values. Types and qualities of court constructions is a very significant factor that ranked first in its contribution to maintenance of a fives courts. Other factors that are very significant include weather and climates, multi-sport uses, soil and terrains, budgets, amount of use and level of plays in order of importance in descending order from second to sixth. Owner's goals and availability of personnel, nature of footwears are significant factors that are ranked seventh, eight, and ninth on the RII.

Table 7. Contributors to maintenance of a squash courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Multi-sport uses	-	-	1	8	11	20	90	4.50	0.9	1 st
2.	Amount of use and level of plays	-	-	12	4	4	20	72	3.60	0.72	3 rd
3.	Weather and climates	-	12	4	4	-	20	52	2.60	0.52	7 th
4.	Budgets	-	3	6	11	-	20	68	3.40	0.68	6 th
5.	Owner's goals	-	2	8	6	4	20	72	3.60	0.72	3 rd
6.	Types and quality of court constructions	-	2	3	6	9	20	82	4.10	0.82	2 nd
7.	Availability of Personnel	-	6	2	8	4	20	70	3.50	0.70	5 th
8.	Volume of traffic	5	2	9	4	-	20	52	2.60	0.52	7 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

From Table 7, multi-sport uses ranked first, types and qualities of court construction, owner's goals, amount of uses and level of plays, availability of personnel, Budgets, Volume of traffics, weather and climates ranked second, third, fourth, fifth, sixth and seventh respectively. The maintenance factors ranked first and second as shown in the table above are very significant. The third, fifth and sixth factors on the RII are all significant factors but the factors that ranked seventh are fairly significant.

Table 8. Contributors to maintenance of a basketball courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of uses and level of plays	-	-	11	6	3	20	72	3.60	0.72	6 th
2.	Weather and climates	4	4	8	4	-	20	52	2.60	0.52	8 th
3.	Location of the court (indoor or outdoor)	-	-	5	9	6	20	81	4.05	0.81	1 st
4.	Budgets	-	-	6	11	3	20	77	3.85	0.77	5 th
5.	Owner's goals	-	-	9	4	7	20	78	3.90	0.78	4 th
6.	Types and quality of court constructions	-	1	4	10	5	20	79	3.95	0.79	3 rd
7.	Nature of footwears	-	-	3	14	3	20	80	4.00	0.8	2 nd
8.	Volume of traffic	4	10	3	3	-	20	45	2.25	0.45	9 th
9.	Availability of technicians	-	2	8	10	-	20	68	3.40	0.68	7 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 8 shows the factors that lead to the need for maintenance of basketball courts. The factor that ranked first is the locations of courts (indoor or outdoor). Nature of footwears, types and qualities of court constructions, owner's goals and Budgets are all very significant factors that ranked second, third, fourth and fifth in that order. Amount of uses and level of plays and availability of technicians ranked sixth and seventh respectively. The factors that are fairly significant in the maintenance of these facilities are weather and climates, and Volume of traffic which are eighth and ninth respectively.

Table 9. Contributing factors to maintenance of volleyball courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of use and level of plays	-	5	3	12	-	20	67	3.35	0.67	6 th
2.	Concentration of people at particular points in the court	-	3	6	11	-	20	68	3.40	0.68	5 th
3.	Weather and climates	-	4	10	4	2	20	64	3.20	0.64	7 th
4.	Soil and terrains	14	4	2	-	-	20	28	1.40	0.28	11 th
5.	Locations of the court (indoor or outdoor)	-	7	8	5	-	20	58	2.90	0.58	10 th
6.	Budgets	-	-	4	14	2	20	78	3.90	0.78	1 st
7.	Owner's goals	-	3	3	10	4	20	75	3.75	0.75	3 rd
8.	Types and quality of court constructions	-	-	7	11	2	20	69	3.45	0.69	4 th
9.	Nature of footwears	3	4	7	3	3	20	59	2.95	0.59	9 th
10.	Availability of Personnel	-	1	5	10	4	20	77	3.85	0.77	2 nd
11.	Volume of traffics	-	4	6	8	2	20	62	3.10	0.62	8 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 9 shows the factors causing maintenance to volleyball courts. From Table 9, budgets ranked first among the factors, followed by availability of personnel. Owner's goals, types and qualities of courts constructions,

concentration of people at particular points on the courts, amount of uses and level of plays, are all significant factors that ranked third, fourth, fifth, and sixth respectively in the maintenance of the facility. Weather and climates, volume of traffic, nature of footwears, locations of the courts (indoor or outdoor), are fairly significant factors that ranked seventh, eighth, ninth and tenth in that order. The least ranked factor is soil and terrain which ranked eleventh as an insignificant factor.

Table 10. Contributors to maintenance of handball courts

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Amount of uses and level of plays	-	-	6	7	7	20	81	4.05	8.10	1 st
2.	Concentration of people at particular points in the court	8	5	5	2	-	20	41	2.05	0.41	10 th
3.	Weather and climates	-	-	8	7	5	20	77	3.85	0.77	2 nd
4.	Location of the court (indoor or outdoor)	-	4	12	4	-	20	60	3.00	0.60	8 th
5.	Budgets	0	3	3	14	-	20	71	3.55	0.71	5 th
6.	Owner's goals	1	2	3	10	4	20	74	3.70	0.74	3 rd
7.	Types and quality of court constructions	-	1	14	3	2	20	66	3.30	0.66	7 th
8.	Nature of footwears	-	2	10	6	2	20	68	3.40	0.68	6 th
9.	Availability of Personnel	-	2	16	2	-	20	60	3.00	0.60	8 th
10.	Volume of traffic	-	3	4	11	2	20	72	3.60	0.72	4 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 10 highlights the factors that brings about maintenance of a handball courts. Amount of uses and level of plays is ranked first. Weather and climates is ranked second and are very significant. Owner's goals, Volume of traffic, Budgets, and nature of footwears are ranked third, fourth, fifth and sixth in contributing to maintenance. Types and qualities of court constructions, availability of personnel, Locations of the courts (indoor or outdoor) and Concentration of people at particular points in the court are fairly significant factors.

Table 11. Contributors to maintenance of table tennis halls

S/N	Contributing Factors	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Weather and climates	-	-	11	7	2	20	64	3.20	0.64	4 th
2.	Locations of the court (indoor or outdoor)	-	5	3	12	-	20	67	3.35	0.67	3 rd
3.	Budgets	-	-	3	15	2	20	79	3.95	0.79	1 st
4.	Owner's goals	-	4	10	4	2	20	64	3.20	0.64	4 th
5.	Availability of Personnel	7	4	3	6	-	20	48	2.40	0.48	7 th
6.	Frequency of uses	-	3	4	11	2	20	72	3.60	0.72	2 nd
7.	Unauthorized usage	6	3	4	7	-	20	52	2.60	0.52	6 th

(1=not a factor, 2=low effect, 3=moderate effect, 4=high effect, 5=extreme effect)

Table 11 shows the factors that cause the need for maintenance of table tennis halls ranked according to their order of importance. The factor that ranked highest is budgets and it is a very significant maintenance factor.

Frequency of uses and the locations of the courts are significant factors that ranked second and third. Owner's goals, weather and climates both ranked fourth and are fairly significant factors. Unauthorized usage and availability of personnel ranked sixth and seventh among the contributing factors and are fairly significant.

3.2 Maintenance Procurement Methods Used

Table 12. Maintenance procurement methods

Procurement Methods	Frequency	Percent	Cumulative Percent
Insourcing	3	15	15
Outsourcing	5	25	40
Insourcing and outsourcing	12	60	100
Total	20	100	

Table 12 shows the various methods of procuring maintenance for the sport facilities. It was observed that 15% of the respondents' insource maintenance, 25% outsource maintenance while 60% use a combination of both insourcing and outsourcing for maintaining of the facilities. It therefore means that maintenance of most of the sports facilities in the North Central Nigeria are carried out using a combination of both methods.

Table 13. Effects of the procurement methods

Effects	Frequency	Percent	Cumulative Percent
No effect	2	10	10
Low effect	2	10	20
Moderate effect	5	25	45
High effect	8	40	85
Extreme effect	3	15	100
Total	20	100	

Table 13 shows the effect of the methods of procurement adopted have on the efficiency of sport facilities. 10% of the respondents say the method of procurement has no effect on the effectiveness of maintenance. Another 10% also opined that the method of procurement adopted has a low effect on effectiveness of maintenance, 25% say it has moderate effect, and 40% say it has high effect. 15% say the choice of type of maintenance procurement method to be used has an extreme effect on efficiency of maintenance. It can therefore be concluded that the method of procurement adopted has a high effect on maintenance efficiency based on the results obtained from the respondents, and as such care must be taken in the choice of procurement methods to be adopted.

Table 14. Insourcing of maintenance for indoor sport facilities

S/N	Elements of facility	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Nets	-	10	9	-	1	20	52	2.60	0.52	5 th
2.	Board surfaces	2	4	4	3	7	20	69	3.45	0.69	4 th
3.	Bats	5	8	2	2	3	20	50	2.50	0.50	6 th
4.	Court surfaces	3	3	2	5	7	20	70	3.50	0.70	3 rd
5.	Rackets	12	3	1	-	4	20	41	2.05	0.41	8 th
6.	Court lightings	9	4	3	2	2	20	44	2.20	0.44	7 th
7.	Gymnasium floors	1	3	2	4	10	20	79	3.95	0.79	1 st
8.	Gymnasia lightings	-	4	5	3	8	20	75	3.75	0.75	2 nd

Table 15 shows the degree to which insourcing is used in the procurement of maintenance works of the various elements of indoor sports facilities. The most maintenance insourced element of indoor sports facility is the gymnasium floor, it is very significantly insourced. It is followed in that order by gymnasia lightings, court surfaces, and board surfaces which are all significantly maintenance insourced. Maintenance of nets, and bats are fairly insourced while the maintenance of court lighting and rackets are not significantly insourced because of the lack of competent in-house staff.

The results obtained implies that most insourced maintenance indoor sport facilities in the area studied is gymnasia floor. This means sport units have the capacity to carry out such maintenance works on their own.

Table 15. Outsourcing of maintenance for indoor sport facilities

S/N	Elements of facility	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Nets	7	9	3	1	-	20	38	1.90	0.38	8 th
2.	Board surfaces	7	4	2	3	4	20	53	2.65	0.53	3 rd
3.	Bats	3	2	3	5	7	20	71	3.55	0.71	2 nd
4.	Court surfaces	10	4	2	2	2	20	42	2.10	0.42	7 th
5.	Rackets	2	1	1	5	11	20	82	4.10	0.82	1 st
6.	Court lightings	6	6	3	3	2	20	49	2.45	0.49	4 th
7.	Gymnasia floors	4	9	2	4	1	20	49	2.45	0.49	4 th
8.	Gymnasia lightings	7	4	5	2	2	20	48	2.40	0.48	6 th

Table 15 shows the degree to which the maintenance of the above listed elements of indoor sports facilities in north central Nigeria are being outsourced. Rackets ranked first, its maintenance is very significantly outsourced. Bats rank second for its maintenance is significantly outsourced. Board surfaces, court lightings, gymnasia floors and gymnasia lightings are all fairly significantly outsourced. The maintenance of other elements of indoor sport facilities such as court surface and nets are not significantly outsourced because of the presence of competent in-house staff.

From Table 15, it can be said that the maintenance of rackets is the most outsourced. This means that most facilities do not have the in-house capabilities to carry out such maintenance works, as such, they have to outsource such maintenance services from other service providers.

Table 16. Insourcing of maintenance for outdoor sport facilities

S/N	Elements of facility	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Football goal posts	7	9	3	1	-	20	38	1.90	0.38	11 th
2.	Football Goal post nets	7	4	2	3	4	20	53	2.65	0.53	8 th
3.	Lawns	1	2	3	5	9	20	79	3.95	0.79	1 st
4.	Court surfaces	2	1	4	6	7	20	75	3.75	0.75	3 rd
5.	Rackets	7	5	3	3	2	20	48	2.40	0.48	10 th
6.	Court lightings	3	2	3	5	7	20	71	3.55	0.71	5 th
7.	Pool water qualities	1	1	6	4	8	20	77	3.85	0.77	2 nd
8.	Pool surroundings	2	4	5	4	5	20	66	3.30	0.66	6 th
9.	Badminton nets	6	5	3	2	4	20	53	2.65	0.53	8 th
10.	Athletics track surfaces	11	3	4	2	-	20	37	1.85	0.37	12 th
11.	Table tennis board surfaces	3	-	3	8	6	20	74	3.70	0.74	4 th
12.	Table tennis bats	4	5	3	4	4	20	59	2.95	0.59	7 th

Table 16 shows the extent to which the maintenance of elements of outdoor sports facilities are being insourced. The element whose maintenance is insourced most is the lawns. The maintenance of lawns, and pool water qualities are very significantly insourced. The degree to which the maintenance of court surfaces, table tennis board surfaces and court lightings are being significantly insourced. The maintenance of pool surroundings, table tennis bat, badminton nets, football goal post nets, and rackets are fairly significantly insourced while the maintenance of football goal posts and athletics track surface are not.

From the results obtained in Table 16, it is evident that maintenance of Lawns is mostly insourced. This invariably means that most of the facilities visited had in-house staff capable of carrying out maintenance works on these elements (lawns) of outdoor sport facilities.

Table 17. Outsourcing of maintenance for outdoor sport facilities

S/N	Elements of facility	Frequency of Response					Σf	Σfx	Mean	RII	Position
		1	2	3	4	5					
1.	Football goal posts	-	3	5	4	8	20	77	3.85	0.77	4 th
2.	Football Goal post nets	1	-	6	5	8	20	79	3.95	0.79	1 st
3.	Lawns	7	4	3	4	2	20	50	2.50	0.50	9 th
4.	Court surfaces	10	5	2	2	1	20	39	1.95	0.39	12 th
5.	Rackets	3	3	2	5	7	20	70	3.50	0.70	6 th
6.	Court lightings	2	1	4	6	7	20	75	3.75	0.75	5 th
7.	Pool water qualities	4	9	5	2	-	20	45	2.25	0.45	11 th
8.	Pool surroundings	7	6	2	2	3	20	48	2.40	0.48	10 th
9.	Badminton nets	-	2	4	8	6	20	78	3.90	0.78	3 rd
10.	Athletics track surfaces	1	3	2	4	10	20	79	3.95	0.79	1 st
11.	Table tennis board surfaces	5	3	6	3	3	20	56	2.80	0.56	8 th
12.	Table tennis bats	3	3	2	5	7	20	70	3.50	0.7	6 th

The Table 17 shows the degree to which the maintenance of elements of outdoor sport facilities are being outsourced. The most outsourced is maintenance for football goalposts and athletics track surfaces. The maintenance of Athletics track surface, football goalpost nets, badminton nets, and football goal post are very significantly insourced maintenance. The maintenance of Court lighting, rackets and table tennis bat are significantly outsourced. The maintenance of Table tennis board surface, Lawn, Pool surroundings, Pool water quality, are fairly significantly insourced while Court surface maintenance is not significantly insourced.

From the results presented in the table above, it is evident that most sports facilities studied had staff that lack the technical know-how or lack the required manpower to carry out maintenance works on an athletics track surface. Because of the point mentioned earlier, they are forced to outsource its maintenance to other service providers outside their organization.

4. Conclusion

It can be concluded that various factors affect maintenance of the various sport facilities in varying degrees. The effects of the various factors on the maintenance of the facilities range from being very significant to not significant depending on the peculiarities of the individual facility.

The method used for the procurement of maintenance works for most sports facilities in North central Nigeria is a combination of both insourcing and outsourcing.

The study showed that the method of procurement of maintenance adopted had high effect on the efficiency of the sport facilities.

The study showed that the element of indoor sport facilities whose maintenance is insourced the most is gymnasium floor while that which is least insourced is the maintenance of rackets.

The element of an outdoor sport facility whose maintenance is insourced most is the lawn while that whose maintenance is insourced least is the athletics track surface.

5. Recommendations

Based on the results of the study carried out, the following recommendations are made:

- 1) It is recommended that resources are channeled towards addressing the factors that affect the maintenance of sports facilities the most instead of attempting to address all the factors at the same time.
- 2) The method of procurement of maintenance works to be adopted should be dependent on the competencies of the in-house staff available. It is therefore advised that sports facility managers use insourcing where they have comparative advantage and outsource maintenance works when they do not have sufficient expertise.
- 3) It is advised that a combination of both insourcing and outsourcing methods be used in carrying out maintenance works on the sports facilities and provide a platform for in-house staff to keep in touch with new developments in the industry.

References

- Adenuga, O. A. I., & Dosumu, O. S. (2012). Assessment of Procurement Methods used for Executing Maintenance Works in Lagos State. *Ethiopian Journal of Environmental Studies and Management EJESM*, 5(4), Suppl. 1. <http://dx.doi.org/10.4314/ejesm.v5i4.S6>
- Alani, A. M., Tattersall, R. P., & Okoroh, M. I. (2002). Quantitative models for building repairs and maintenance: A comparative case-study. *Facilities*, 20(5/6), 176-189. <http://dx.doi.org/10.1108/02632770210426666>
- British, S. (1984). *Glossary of maintenance management terms in terotechnology*.
- Cavalli, M. O. (2009). *Socio-political role of Physical Education and Sport: Political objectives of Physical Education*. Retrieved July 4, 2014, from <http://www.efdeportes.com>
- Chan, K. T., Lee, R. H. K., & Burnett, J. (2001). Maintenance performance: A case study of hospitality engineering systems. *Facilities*, 19(13/14), 494-503. <http://dx.doi.org/10.1108/02632770110409477>
- Coetzee, J. L. (1999). A holistic approach to the maintenance "problem". *Journal of Quality in Maintenance Engineering*, 5(5), 276-280. <http://dx.doi.org/10.1108/13552519910282737>
- El-Haram, M. A., & Horner, M. W. (2002). Factors affecting housing maintenance cost. *Journal of Quality in maintenance Engineering*, 8(2), 115-123. <http://dx.doi.org/10.1108/13552510210430008>
- Keith, E. (2009). *Performance based facility management*. Retrieved April 25, 2013, from <http://www.ijfm.net/index.php/ijfm/article/view/PDF%20interstitial/11/14>

- Lam, K. C. (2000). *Planning and execution of business—Centered maintenance for perfect buildings*. Retrieved July 4, 2014, from <http://www.cibse.org/pdfs/centeredmaintenance.pdf>
- Lee, H. H. Y., & Scott, D. (2009). Strategic and operational factors' influence on the management of building maintenance operation processes in sports and leisure facilities. *Journal of Retail and Leisure Property*, 8, 25-37. <http://dx.doi.org/10.1057/rlp.2008.29>
- Natural, T. (2008). *Guidance notes on the construction, maintenance and performance of natural turf pitches* (8th ed.). Facility Development Unit Football Association of Ireland National Sports Campus Abbotstown Dublin 15.
- Orunaboka, T. T., & Nwachukwu, E. A. (2012). Management of Physical Education Facilities, Equipment and Supplies in Secondary Schools in Nigeria: Issues and challenges. *Journal of Education and Practice*, 3(3).
- Rover, T. (2009). <http://www.footballgroundguide.ipbhost.com/index.php?Showtopic=18788>
- Tse, P. W. (2002). Maintenance practices in Hong Kong and the use of the intelligent scheduler. *Journal of Quality in Maintenance Engineering*, 8(4), 369-380. <http://dx.doi.org/10.1108/13552510210448540>
- Westerbeek, H., Smith, A., Turner, P., Emery, P., Green, C., & Leeuwen, L. V. (2005). *Managing sport facilities and major events*.
- Wood, B. (1999). Intelligent building care. *Facilities*, 17(5/6), 189-194. <http://dx.doi.org/10.1108/02632779910259288>
- Wood, B. (2003). Approaching the care-free building. *Facilities*, 21(3/4), 74-79. <http://dx.doi.org/10.1108/02632770310469389>
- Zavadskas, E., Bejder, E., & Kaklauskas, A. (1999). Raising the efficiency of the building lifetime with special emphasis on maintenance. *Facilities*, 16(11), 334-340. <http://dx.doi.org/10.1108/02632779810233610>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).