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FACTORS INFLUENCING BUILDING MAINTENANCE SOURCING DECISION IN NIGERIA SOUTHWEST UNIVERSITIES

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ABSTRACT

Appropriate decision making on either to insource or outsource maintenance services in universities is a strategic task. Such a decision-making process is usually complex and challenging. Insourcing maintenance services, different sourcing option suits different maintenance scenarios, hence the need to study the factors influencing decision to insource or outsource maintenance services in any particular organisation or institution. Through a cross-sectional survey, data were gathered from 112 respondents comprising a census of 28 maintenance managers and purposive sampling of 84 maintenance technical staff. The relative influence index and the Welch's test were employed as statistical tools for data analysis. The results indicate that factors influencing insourcing of maintenance services in universities include: the development of in-house maintenance staff, technological requirements uncertainty and the difficulty in getting trustworthy contractors. Factors influencing building maintenance outsourcing decision in universities include the need for specialised expertise, strategic alliance with contractors and the need for specialised management. The results of the Welch's ANOVA F (2, 87) =3.50, p=0.17 and F (2, 92) =2.08, p=0.26, showed that there was no significant difference in the factors influencing insourcing and outsourcing decisions across federal, state and private universities respectively. The study concludes that insourcing decision is influenced by management factors while outsourcing decision are influenced by strategic and technological factors.

Keywords: In-sourcing, Outsourcing, Tertiary Institutions, Buildings, Maintenance.

INTRODUCTION

The maintenance management of theeducational facility is important because the condition of buildings and its associated services have animpact on the performance of students and staff (Marilyn, 2006; Smith, 2008; Hopland, 2012). Recent studies on the impact of school buildings on students health(Baker and Bernstein, 2012; Mcintyre, 2016) reveal that the condition of school buildings does not only affect the academic performance of students but also impact their health and psychological well-being.Mcintyre (2016)posits that school buildings that are characterised by various forms of defects have both physical and psychological consequences on all category of users. Therefore, for university buildings to provide requisite comfort and safety for students, staff, visitors and indeed all users, it is

essential that appropriate maintenance management sourcing strategy is deployed.Siyanbola, Ogunmakinde and Akinola (2013) posit that it is practically impossible to produce buildings which are maintenance free. Although much can be done at the design stage to reduce the amount of maintenance work to be executed at the operation and maintenance phase of buildings, building elements nonetheless deteriorate over time relative to the nature and characteristics of construction materials, method of construction, age, environmental conditions, usage, method of design and maintenance management system in place for the building (Adenuga, Odusami and Faremi 2007).

Previous studies have lamented the deteriorating state of buildings in the nation's universities(Moja, 2000; Odia & Omofonmwan, 2007; Aluko, 2011; Yusuff, 2011; Ifenkwe, 2013). The poor state of the facilities in Nigerianuniversities is not as a result of lack of maintenance activities asthe universities have dedicated maintenance unit usually within the works and physical planning department. However, in spite of the universities having dedicated maintenance units, most of the buildings and infrastructure in the nation's universities are in a state of disrepair which undoubtedly has hindered the delivery of quality university education in many of the universities (Edukugbo, 2013).

Thedecision to insource or outsource an activity in any organisationhas aprofound effect on the success or failure of such activity (Rawlinson, 2006).However, the making of appropriatedecision on either to insource or outsource services is strategic in nature and often times constitute a challenge to decision makers. Jin, Chua, Ali, and Alias (2012)add that of uncertain outcome is the practice of selecting a sourcingoption based on general adaptation as different sourcing option suits different situations. The determination of an appropriate decision (i.e. to outsource or insource) maintenance services are influenced by many considerations. One of maintenance consideration is that of multi-criteria (several factors influencing final decision). Due to the paucity of studies on the factors influencingthe decision to adopt insourcing or/and outsourcing maintenance practice(s) in universities, the problem of the study,therefore, is concerned with investigating the factors influencing the practices of insourcing and outsourcing maintenance services in universities in Southwest Nigeria.

The objective of the study is to evaluatefactors influencing the decision to insource oroutsource building maintenance services in Nigeria Southwest universities.

Research Hypotheses

The hypotheses postulated for this study are as follows:

- **H1:** There is no significant difference in the factors influencing building maintenance insourcing decision in Federal, State and Private Universities in Southwest Nigeria.
- **H2:** There is no significant difference in the factors influencing building maintenance outsourcing decision in Federal, State and Private Universities in Southwest Nigeria.

LITERATURE REVIEW

The concept of insourcing and outsourcing services

Maintenance management services can be procured through insourcing or outsourcing (Natukunda and Pitt, 2011). Sometimes a combination of insourcing and outsourcing are employed in a hybrid sourcing arrangement. Atkin and Brooks (2009) opine that the

approach is taken often depends on the priority set by the organisation or institution procuring the service.Association for Public Service Excellence APSE(2011) posits that insourcing was regarded as a means of delivering efficiencyand cost savings in the face of mounting budgetary pressure. Although Goure (2011) argue that the expectation of efficiencies and cost savings through insourcing public projects are seldom met.Outsourcing, on the other hand, results from an economic climate, where the emphasis is on cost savings and increased quality especially for lean operations(Faremi, Adenuga and Ameh, 2017).Ikediashi et al.(2012),Brown and Fersht (2014)argue that the guiding principle of outsourcing is that non-core activities of an enterprise or organisation could be handed over to companies with lower labour costs and with expertise in those activities, thereby freeing internal resources to focus on enhancing the value-add of the organisations core business.

Factors influencing the decision to insource or outsource maintenance services

The decision to insource or outsource maintenance services in an institutionemanates from the ability of the institutions' policymakers to define maintenance requirements and the ability to relate asset performance to maintenance effectiveness(Toossi, 2011).Dawne (2011) opine that the factors influencing decision to insource maintenance services include timing and coordination of activities, potential damage to the reputation of institution by outsourced vendor's action, consideration of maintenance activities as core to the institution, difficult to find vendor with compatible organisational culture, subcontractor could act in their own interest to the detriment of the institution, difficultyof finding vendors that are trustworthy, economies of scale, difficulty in contracting unpredictable activities, difficulty in appraising vendor's performance and vendor may feel exposed to potential loss of investment among others.

Stanimirovic (2013)opines that the five reasons why companies outsourceinclude; the need to focusresources oncore activities, cost reduction, the need to convert fixed costs to variable costs, benefit fromsupplier's investment and innovation, and improved time to market. Similarly, Assaf, Hassanain, Al-Hammad, and Al-Nehmi (2011) discuss thirty-eight (38) factors influencing the decision to outsource maintenance services. These set of factors were grouped into six major categories comprising: strategic factors, economic factors, management factors, technological factors, function characteristics, and quality factors.

Comparatively, Jin, Chua, Ali,and Alias (2014)asserts that in making the decision to insource or outsource maintenance services, the importance of a number of factors has to be ascertained. The recommended factors include; execution speed, time certainty, price or cost certainty, degree of complexity, degree of flexibility, responsibility, risk allocation or avoidance, quality level, working relationship, clarity of scope, intuition and past experience of the decision maker, dissatisfaction with previous process used, knowledge of the strategy, client's involvement in the project, existing building condition, size of the building, client's in-house technical capability, client's financial capability, external environment and factor, price competition, public accountability, culture, objective or policy of organisation, government policy, dispute and arbitration and availability of experienced contractor.

This study examines all the factors for insourcing and outsourcing decision as presented in the various literaturereviewed for this study with a view to determining those that are significant in influencing the decision of policymakers of tertiary institutions within the study area thus contributing to the existing body of knowledge.

RESEARCH METHOD

A cross-sectional survey design was adopted for this study. The survey was conducted across universitiesin Lagos, Ogun, Oyo, Osun, Ondo and EkitiStates respectively. The population of the study comprise maintenance managers and maintenance technical staff across universities inSouth-West Nigeria. Primary data were collected for this study using structured questionnaires. Secondary data were collected for this study from the archives of the National Universities Commission (NUC). Twosample sizes were determined for this study. The summary of the sample size, number of questionnaires administered and retrieved as well as the response rate of return is shown in Table 1. The first sample for this study was a census of the twenty-eight (28) maintenance managers across the universities in Southwest Nigeria while the second sample for the maintenance technical staff was determined using the simplified formula for proportions proposed by Yamane (1967). Purposive sampling technique was adopted in administering the research instrument for the maintenance technical staff. This was to ensure that the research instruments were completed by targeted respondents.

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Table 1: Sample sizes and survey rate of returns for this study.

State	**Maintenance manager**				**Maintenance technical staff**			
	SS	**NA**	**NR**	**RR**	**SS**	**NA**	**NR**	**RR**
LAGOS	4	4	4	100%	16	17	16	94%
ONDO	3	3	3	100%	6	6	6	100%
OYO	2	2	2	100%	12	12	12	100%
OGUN	10	10	10	100%	24	27	24	89%
OSUN	6	6	6	100%	17	18	17	94%
EKITI	3	3	3	100%	9	11	9	82%
TOTAL	**28**	**28**	**28**		**84**	**91**	**84**	

Note: SS= Sample size, NA= Number of questionnaires administered, NR = Number of questionnaires retrieved, RR= Response rate (%).

DATA PRESENTATION AND ANALYSIS

Based on an extensive review of the literature, the taxonomy of 49 variables influencing decision to insource or outsource services was developed and presented to the respondents to evaluate. The relative influence index (RII) score of each of the factors on insourcing and outsourcing decisions were calculated as shown in Table 2. The calculated RII values were interpreted using the scale RII ≥ 0.76 means most significant, 0.67 ≤ RII ≤ 0.75 means significant, 0.45 ≤ RII ≤ 0.66 means less significant and RII ≤ 0.44 means not significant (Waziri and Vanduhe, 2013; Magutu and Kamweru, 2015).

Table2: Factors influencing decision to insource or outsource maintenance services in universities

Factors influencing maintenance sourcing	**Insourcing**	**Outsourcing**

decision	RII	Rank	Remark	RII	Rank	Remark
Strategic Factors						
Developing internal staff	0.92	1	MS	0.31	48	NS
Maintenance is core to institution	0.67	18	LS	0.36	45	NS
Potential damage to reputation of institution	0.74	9	S	0.35	47	NS
Accelerate re-engineering benefits	0.70	16	S	0.68	31	S
Regulations governing outsourcing practices	0.45	25	LS	0.64	38	LS
Improve flexibility to the changing market dynamics	0.43	32	NS	0.67	35	S
Strategic alliance with contractors	0.37	43	NS	0.93	2	MS
Freeing resources for core activities	0.36	44	NS	0.68	30	S
Risk sharing with contractors	0.35	46	NS	0.66	36	LS
Focus on core activities	0.27	48	NS	0.69	19	S
Access to world class capabilities	0.27	49	NS	0.69	25	S
Management Factors						
Difficulty in appraising subcontractor's performance	0.89	4	MS	0.39	39	NS
Difficulty in getting trustworthy subcontractors	0.90	3	MS	0.2	49	NS
Potential conflict of interest between subcontractor and institution	0.82	6	MS	0.36	42	NS
Difficulty of getting subcontractors with compatible organisation culture	0.80	7	MS	0.35	46	NS
Safety management	0.72	14	S	0.69	23	S
Consolidation and decentralisation	0.71	15	S	0.68	29	S
Function difficult to manage and control	0.69	17	S	0.80	10	MS
Increase the speed of implementation	0.63	20	LS	0.70	14	S
Reduce management load	0.43	30	NS	0.70	17	S
Save management time	0.43	35	NS	0.69	20	S
Need for specialised management	0.36	45	NS	0.92	3	MS
Economic Factors						
Economies of scale	0.76	8	S	0.36	44	NS
Potential loss of investments	0.65	19	LS	0.36	43	NS
Cash infusion	0.53	21	LS	0.69	26	S
Accountability	0.53	22	LS	0.91	4	MS
Transform fixed cost into variable costs	0.45	23	LS	0.67	34	S
Increase the economic efficiency	0.44	26	NS	0.70	13	S
Improve the cash flow	0.44	28	NS	0.68	28	S
Make capital funds more available for core activities	0.43	29	NS	0.70	15	S
Overall maintenance cost reduction	0.43	36	NS	0.89	6	MS
Quality Factors						
Improve process responsiveness and cycle time	0.45	24	LS	0.67	32	S

Factors influencing maintenance sourcing decision	Insourcing			Outsourcing		
	RII	Rank	Remark	RII	Rank	Remark
Procure higher reliability and competency	0.43	33	NS	0.86	8	MS
Improve quality requirements	0.42	37	NS	0.86	7	MS
Improve service quality	0.42	38	NS	0.84	9	MS
Achieve high quality of service for competitive advantage	0.42	40	NS	0.74	11	S
Technological Factors						
Timing and coordination of maintenance activities	0.88	5	MS	0.37	41	NS
Initiate innovative ideas and techniques	0.74	10	S	0.70	16	S
Improve the technology for competitive advantage	0.74	11	S	0.70	18	S
Acquire new skills or technical knowledge	0.42	39	NS	0.71	12	S
Need for specialised expertise	0.39	41	NS	0.94	1	MS
Achieve flexibility with changing technology	0.38	42	NS	0.69	21	S
Technology requirements uncertainty	0.90	2	MS	0.65	37	LS
Function Characteristics Factors						
Complexity of function	0.73	12	S	0.69	24	S
Difficulty in contracting unpredictable activities	0.72	13	S	0.38	40	NS
Lack of spare parts	0.44	27	NS	0.67	33	S
Lack in equipment /tools availability	0.43	31	NS	0.69	27	S
Function integration and structure	0.43	34	NS	0.69	22	S
Lack of internal resources for a service	0.34	47	NS	0.90	5	MS

Note: Most Significant at: *RII≥ 0.76; MS= Most significant, S= Significant, LS= Less significant.

The results show that themost significant factors influencing decision to insource maintenance services in universitiesinclude; the development of internal staff (RII=0.92),technological requirements uncertainty (RII=0.90),difficulty in getting trustworthy contractors (RII=0.90), difficulty in appraising subcontractor's performance (RII=0.89), timing and coordination of maintenance activities(RII=0.88)among others.On the other hand, the most significant factors influencing decision to outsource maintenance services in universities include; the need for specialised expertise (RII=0.94), strategic alliance with contractors (RII=0.93), the need for specialised management (RII=0.92), accountability (0.91) and lack of internal resources for a service (RII=0.90).

Hypothesis 1:
There is no significant difference in the factors influencing decision to insource maintenance services in federal, state and private universities in Southwest Nigeria.

The hypothesis was tested using Welch'sANOVA. The Welch's ANOVA was adopted in order to accommodate for the unequal variances and unequal sample sizes across the universities(Cooper & Schindler, 2014). The summary of the results is shown in Table 3.

Table 3: Welch's ANOVA of factors influencing decision to insource maintenance services in federal, state and private universities

Factors influencing insourcing decision	Test	F	df1	df2	p-value
Factors influencing building maintenance insourcing decision in Universities	Welch's test	3.50	2	87	.17

Note: Significant at *p≤0.05

The result shows that F (2, 87) =3.50, p=0.17. With p>.05, the null hypothesis is accepted.This implies that there is no significant difference in the factors influencing decision to insource maintenance services in federal, state and private universities in South-West Nigeria.

Hypothesis 2:
There is no significant difference in the factors influencing decision to outsource maintenance services in federal, state and private Universities in South-West Nigeria.

Using Welch's ANOVA,the results(Table 4) reveals that F (2, 92) =2.08, p=0.26. With p>.05, the null hypothesis is accepted.

Table 4: Welch's ANOVA of factors influencing the decision to outsource maintenance services in federal, state and private universities

Factors influencing outsourcing decision	Test	F	df1	df2	p-value
Factors influencing building maintenance outsourcing decision in Universities	Welch's test	2.08	2	92	0.26

Note: Significant at *p≤0.05

DISCUSSION OF FINDINGS

The result suggests thatpolicymakers are aware of the significant role of maintenance activities in the preservation of buildings in universities and are careful at relinquishing such sensitive responsibilities to untrusted subcontractors. Lateef, Khamidi, and Idrus (2011) emphasize the need for caution in the maintenance of university buildings as theyare meant to create asuitable, conducive and adequate environment to support, stimulate and encourage learning, teaching, innovation and research activities.Furthermore, the result aligns with the findings of Sheng (2012), Muchai and Acosta, (2012) that institutions oftentimes engage the services of third-party vendors to execute maintenance activities requiring high-levelspeciality. In addition, the result shows that the factors influencing thedecision to insource or outsource maintenance services do not differ across the universities (federal, state or private owned). This result supports the findings of Steenbeek, Wijngaert, Brand and Harmsen (2005) that similar factors are likely to influence the decision of firms or organisation with similar business goals.

CONCLUSIONS AND RECOMMENDATIONS

The decision to insource maintenance activities in universities are essentially influenced by managementfactors.Although the development of in-house maintenance staff ranked as the topmost factor influencing maintenance insourcing decision in universities. Often times,such an objectiveis pursued through on-the-job training of in-house maintenance staff. The study reveals that maintenance policymakers in universities have areservation in committing the maintenance of buildings to subcontractors due to thepotential risk of poor performance. Furthermore, maintenance services are outsourced when universities have the need for

specialised maintenance expertiseand when universities have the need to leverage on astrategic alliance with contractors for maintenance service delivery. It is therefore recommended that maintenance services in universities should be executed using insourcing practice when there is aneedfor in-house staff capacity development, uncertainty in maintenance technical requirements and when there is difficulty in getting trustworthy contractors and appraising contractor's performance. However, maintenance services in universities should be outsourced when there is the need for specialised expertise, strategic alliance with contractors and when there is the need for specialised management of building systems or services.

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