



# Conceptual Modeling of Facilities Management Driven Hotels in South-Western Nigeria

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**Abstract:** Models in whatever form on Facilities Management (FM) driven business organizations are scanty in literature, and the available models are developed to depict the workings of few sections of facilities management, covering just few sectors of the Nigerian economy. Consequently, the researcher attempted to develop a conceptual model based on what is reasonably expected of the impact of facilities management principles on hotel organizations adopting FM holistically in South-Western Nigeria. The Conceptual model is validated based on the results emanating from a survey of fifty-seven hotels. Out of the fifty-seven questionnaires administered on hotel management, twenty-eight (49%) were retrieved while in respect of customers, six hundred and seventy-one questionnaires were administered from which three hundred and sixty (54%) were retrieved. Stratified sampling technique was adopted to select the samples while appropriate sample size was determined following the formula given by Kothari (1978). Data analysis was executed using descriptive statistics and Chi-Square ( $\chi^2$ ). The validated heuristic model was derived and recommended as a template for hotel management operation where facilities management principles are employed.

**Keywords:** Facilities Management, Heuristic Model, Hotel Operation, Model Validation

## 1.0 Introduction

Literature is replete with the huge benefits derivable from holistic application of Facilities Management (FM) principles to business organizations (Owen, 1995; Spedding and Holmes, 1999; Meyer, 2003; Adewunmi and

Ogunba, 2006; and Durodola, Ayedun and Akinjare, 2012). The general presumption is that organizations imbibing the tenet of FM invariably remain effective. For instance, Hamer (1988) insisted that by implementing a facilities management program, the manager

should be able to develop more meaningful and accurate forecasts of future space requirements; reduce expenditure of resources, prepare more accurate future capital budgets; provide a framework within which to meet established budgets more effectively; improve employee morale; and improve organizational performance. Others are encouragement of employees to become more anticipatory and less reactionary in their facility management decisions; manage information proactively; carry out inventory of space and control of equipment and furnishings; control effectively capital resources required to support operations; and achieve improvement in overall work environment.

Researchers (notably, Amaratunga, 2000; Bracketz and Kenley, 2002; Kotze and Nkado, 2003; Okoro, Jones and Ilozor, 2003; Wai, 2003 and Durodola, 2009) probed into the efficacy of FM in solving organizational problems wherever it is holistically adopted as instrument of strategic change. Amaratunga (2000) in examining building performance evaluation in higher education properties in Britain from facilities management perspective developed a strategic framework which indicates elements of major importance for achieving overall corporate goals. Bracketz and Kenley (2002) examined facilities management in Australia from the perspective of facilities

performance in local government and found that the use of balanced score card in facility-related decision-making improve support from those it is intended to serve while Kotze and Nkado (2003) investigated the use of facilities management in institutions of higher learning in South Africa concluding that there is need to adopt scenario planning as a tool in FM practice. Okoroh, Jones and Ilozor (2003) studied FM in hotel organizations in Great Britain and established that given the nature of hotels, there are tremendous benefits to be derived from the application of FM values in running hotels. Wai (2004) investigated the extent of and barriers to the application of facilities management to hotel renovations in Hong Kong and concluded that Facilities Management is a relatively new topic in Hong Kong and that research studies in FM in relation to hotel renovations were unpopular. Durodola (2009) studied the use of FM in hotel organizations in South-Western Nigeria and concluded that hotels that adopt FM principles in running the hotels are more effective than others using other assets management methods. Undoubtedly, traces of effectiveness of FM are being established within the business organizations that were studied. However, the researchers did not model the impact of FM on the organizations studied to give potential users, reasonable platform

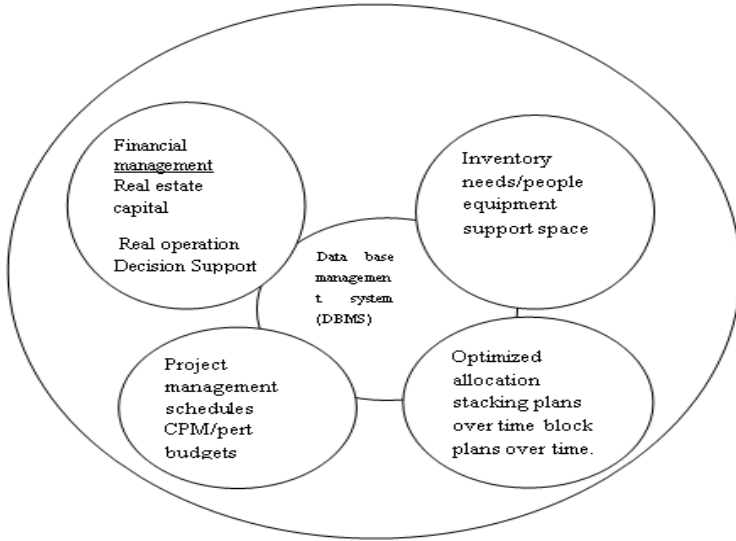
on which to test-run the potential strategic change before wholly adopting FM for implementation. Udo (2003) averred that one of the basic reasons for developing models is to discover which variables are the important or pertinent ones. The discovery of the pertinent variables is closely associated with the investigation of the relationships that exist among the variables. A model is therefore essentially a device that reflects the workings of the real world and in order to gain insight into the workings of the real world it is usually better to use models. This paper therefore attempts to present a potential heuristic graphical model of facilities management driven hotel organizations based on empirical study of hotels in South-Western Nigeria. The work is divided into seven sections namely introduction, literature review, conceptual framework, the a priori expectations of the impact of FM, the research method, working the variables, validating the conceptual model, conclusion and recommendation.

The research focused on hotel organizations simply because the industry is crucial to the growth and development of tourism as a foreign

exchange spinner for many countries of the world, Nigeria inclusive. Just like any going concern, hotel organizational structures are not immune to the influences of the economy and business cycles, so the difficulties that befall business in general during economic down-turns also affect hotel organizations. Downsizing, reengineering, facilities management and strategic estate management are some of the strategic tools being used to describe the changes hotel companies have undergone or are undergoing Rutherford (2002).

## **2.0 Literature Review**

Hamer (1988) developed a conceptual model of Facilities Management System as shown in Figure 1. The model tried to show the relevance of Information and Communication Technology in FM implementation. This emphasized the usefulness of central Data Based Management System (DBMS) in implementing FM in organizations and clearly showed the links with other independent variables. The model posited a scholastic outlook; however, it is heuristically driven and conceptual in nature without any validation.

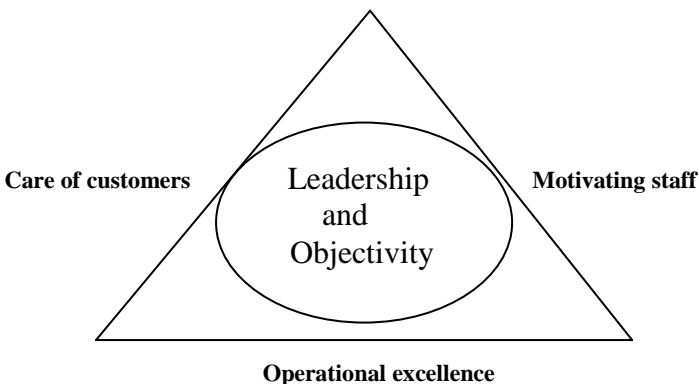


**Fig 1 : - A Conceptual Model of Facilities Management System**  
**Source: - Hamer (1988)**

The centrality of database management system (DBMS) as a dependent variable in achieving success in facilities management operation is emphasized while the operators and the beneficiaries of the services being rendered are relegated to the background. Besides, the model might have been heuristically developed without validation limiting its acceptance.

Torkildsen (1992) in a study of successful facility managers in the public and private sectors of the United

Kingdom’s economy, established a conceptual model suggesting that effective operational management of leisure facilities generally is a function of leadership, objectivity, staff motivation and care of customers. The four variables were found to be almost universal. Torkildsen’s model as depicted in Figure 2 appears confusing as leadership and objectivity assumed the central focus as against operational excellence that is declared to be the dependent variable.



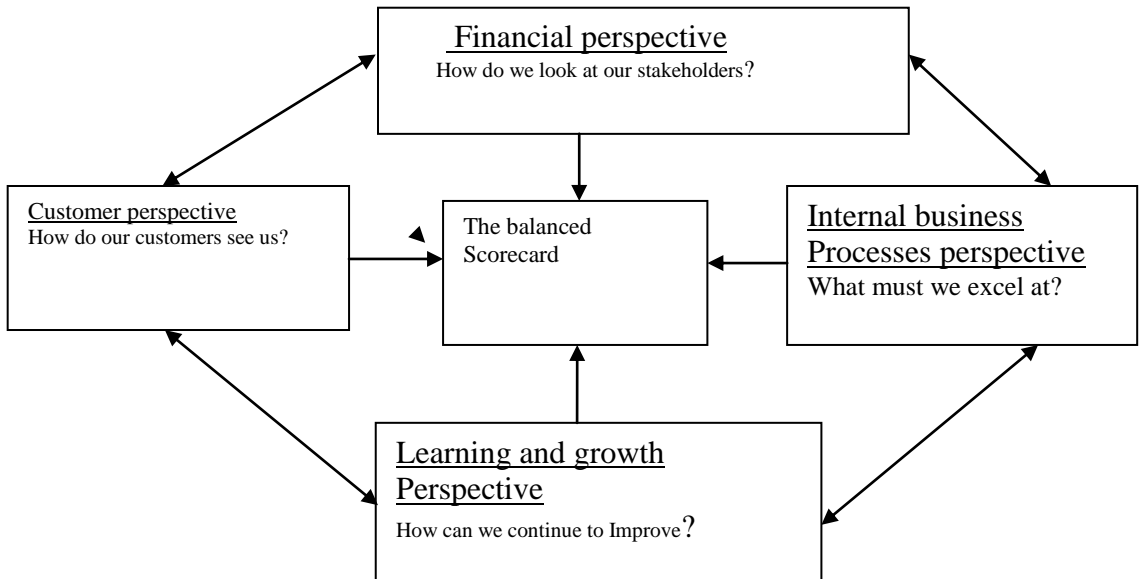
**Fig 2:** A Model for the Effective Operational Management of Leisure Facility. **Source:** - Torkildsen (1992)

Nonetheless, this model is classic in outlook as it explores the interface between management, staff, customers and strategic initiative of the organization. The model is heuristically developed without validation and its effectiveness in reality has not been established.

In Amaratunga's (2000) building performance evaluation in higher education properties in Britain from facilities management perspective, the use of FM in promoting organizational performance and competitive advantage using the balance scorecard approach was

explored. In the study, three Universities were selected and a conceptual model was developed as shown in Figures 3.

The conceptual model provides a strategic framework for evaluating operational performance and indicates the elements of major importance for achieving overall corporate goals. It focused on performance measurement and has therefore become a relevant model employable when trying to measure the impact of FM on corporate organizations especially where benchmarking is involved.

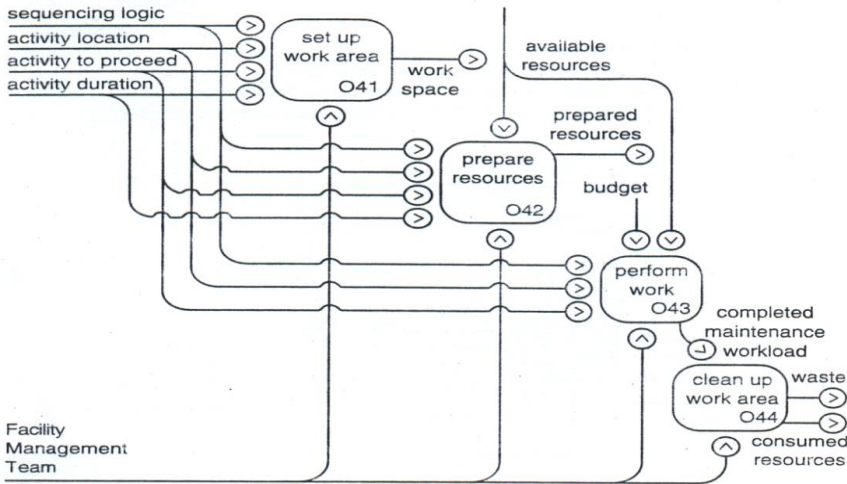


**Fig. 3:** - The Balanced Scorecard (BSC) **Source:** Amaratunga (2000)

However, the model is extremely narrow in outlook and operation and not validated.

Furthermore, Hassanain, Froese and Vanier (2003) developed a conceptual model for Asset

Maintenance Management aimed at developing IT solutions for the Asset maintenance industry which includes facilities management as shown in Figure 4.



**Fig. 4:** A model Node for Accomplished Maintenance Workload  
**Source:** Hassanain, Froese and Vanier (2003)

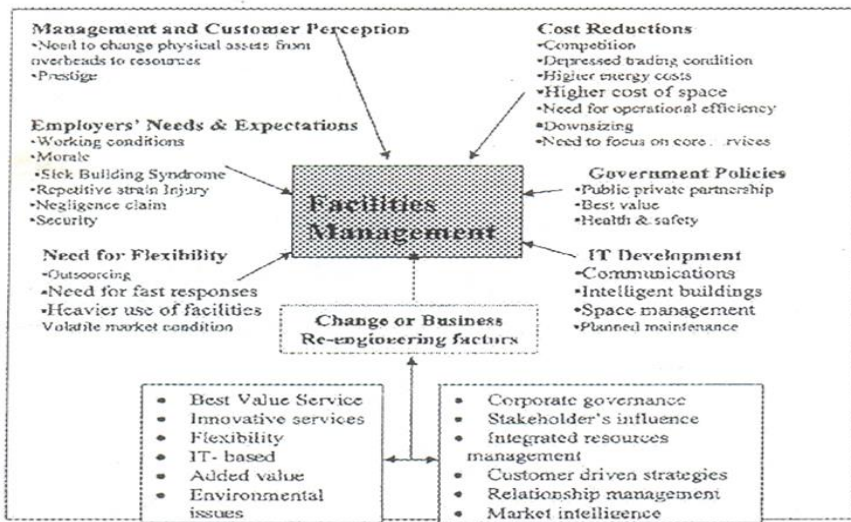
The work describes a collection of knowledge areas within the domain of asset maintenance management. Although, the areas have previously existed in practice and are documented in literature, they have not been introduced to the asset management (AM) domain in a formalized and standardized form as presented through the development of a process model. This model is a strategic tool that can be used in maintenance activities under facilities management. This model offers innovative and logical step towards the achievement of specific tasks in maintenance activity; however, its practical application has not been

established through empirical analysis. Furthermore, the model is sectional and not really targeted at a particular industry to be able to test its veracity and the fact that it was not validated by any empirical study makes it difficult to accept out rightly.

Okoroh, Jones and Ilozor (2003) in a study on facilities management and hotel organizations in Great Britain dwelt on adding value to constructed facilities with emphasis on the hospitality industry. The study examined the impact of service contact on perceived quality and nature of the accommodation package. It was averred that a number of trends have become

evident as influencing the rapid growth of facilities management. On the supply side, there has been a rapid increase in the number of contractors offering the services, partly through “pull factors” or demand led elements of cost reduction, flexibility, specialists in so many fields; and partly through “push factors” or increased supply; stimulated by competitive

tendering, PRIVATE FINANCE INITIATIVE (PFI), PUBLIC PRIVATE PARTNERSHIP (PPP), and technological advances. More importantly, are the contributions of globalization, information and communication technology, competition, strategic management and shareholders’ pressure. These factors were conceptually modeled as shown in Fig. 5.



**Fig. 5:** - Conceptual Model of Recent Pressures influencing FM Development  
**Source:** - Okoroh, Jones and Ilozor (2003)

This work even though instructive as regards variables impacting on the development of FM, it is just a conceptual model and a prognosis not validated. However, it shows the attempts by the authors to come up with models reflecting the workings of FM, with several others that have same pattern of palpable defect and non-validation. From the foregoing, the importance of model development reflecting

the procedure of implementing FM applying established principles in FM operation, and reflecting the impact of FM on organizations have been identified. It could be deduced that developing models in FM is not new; however, most of the models are sectional in nature, graphical and conceptual without validation. In particular, there is no conceptually or specifically developed model depicting the

workings of FM on hotels apart from Torkildsen's (1992) model for the effective operational management of leisure facility, which may be generically applicable to all going-concern and business organizations. With the identified anomalies, the researcher attempts to develop and validate a model for facilities management driven hotel organizations.

### **3.0 The Conceptual Framework**

First, the quantities and qualities of facilities provided by a hotel dictate its rating on the international platform and with the establishment of Nigeria Tourism Development Corporation (NTDC), appropriate rating and grading system has been institutionalized. Most of the hotels in Nigeria were built prior to NTDC grading coming into being, and it is expected that those established after the advent of the NTDC would comply with international standards. The NTDC grading was drawn from the international grading and comprehensiveness;

and hotels that comply with the grading are usually used for assessment.

Second, it is expected that organizations that adopt FM would have dispensed with property and maintenance management principles, which would have been absorbed by FM. In that case, there is a probability that the Engineering Department would be renamed FM Department and the functions of FM would be predominant in the set up. In essence, a drastic transformation is expected and organizational set up would be transformed physically and logistically to comply with facilities management principles.

Third, a full-fledged Facilities Management Department, even if not so named, must be established around Hamer (1988)'s model, if not more and deploying all the tools as enunciated in Mbamali and Adebayo (2006) as depicted in Table 1.



Table 1: Facilities Management Functions and Tools

S/No	Function	Issues Involved	Tools
1	Built Asset Management	a) Conservation of built assets b) Renewal and improvement works c) Building Operation Management	i) Asset tracking and register ii) Cyclical Maintenance iii) Condition based Maintenance iv) Response or Emergency Maintenance v) Health and Safety Monitoring vi) Cost- in-use assessment vii) Energy use auditing and control viii) Life Cycle Assessment ix) Information Technology
2	Strategic Property Management	a) Provide and Sustain suitable space at an economic cost b) Provide acceptable return over time for the cost of investment.	i) Estate data base ii) Performance Analysis iii) Administrative Strategy iv) Estate Investment programme v) Estate Control Plan vi) Estate Operational Plan vii) Life Cycle Costing
3	Organization people and processes	a) Provides satisfying space and internal environment for the entire workforce. b) Provide satisfactory space and internal environment for the processes undertaken by the organization c) Manage Support Services	i) Task implementation monitoring ii) Internal environment monitoring iii) Space Design Procurement and utilization optimization. iv) Internal environment monitoring
4	Valuations	a) Investment Appraisal b) Assessment of property worth in the open market.	i) Cost - benefit Analysis ii) Investment Return Rates iii) Income Capitalization vi) Yield Determination
5	Contract Procedures	a) Procurement of new Construction b) Adaptation of existing structures c) Contracting out of services in the operation of buildings.	i) Proper Identification of needs. ii) Brief Articulation iii) Designs' Implementation via constructions iv) Building Occupation and evaluations.

**Source:** Mbamali and Adebayo (2006)

From Table 1, major functions and associated activities of FM are identified along with required tools to achieve the aim of FM. Essentially; these are activities that are required to be seen as being executed by the FM Department. The Head and the subordinate staff must think and practice facilities

management while its structure must reflect facilities management. Above all, the activities of the department must be backed up sufficiently with human and material resources, chief of which is information and telecommunication technology.

The importance of the contributions that the General Manager (GM), the Facilities Manager, the Line Managers, the Management and the Customers make to the propagation and sustenance of facilities management have been brought to the limelight. The GM is the arrowhead of the establishment and occupies the driver's seat; seeing the horizon. Apart from enviable training, experience and exposure, such a person must be proactive, begin with the end in mind, put first things first, "think win-win" always, seek first to understand than to be understood, synergize and sharpen the saw in that order. The Facilities Manager and Line managers must have the same peculiar characteristics with the GM to be able to drive the vision and the mission of the former to a laudable conclusion (Conklin, 2002; Nebel and Ghei, 2002; and Covey, 2000).

From the foregoing, the variables that impact facilities management driven hotel organizations include the organization itself, the Hotel General Manager (GM), the Business Development Unit (BDU), the Line Staff (LS), the Customers, the Hotel Features, the Facilities Manager, and the Facilities Management Department. The presumption is that if all the variables identified are in place and effectively operated, the impact on hotel organization would result into a vibrant hotel organization

measurable in terms of comparable reasonable charges, high quality of facilities and services, high speed of service delivery, high room occupancy rate which translates to effective hotel. These variables are said to be cogent and compelling in FM operations in hotel organizations [Durodola (2009)]. All the variables must feature in any meaningful model for facilities management driven hotel organization. The purpose of the conceptual model is to assist in identifying the features of a performing hotel and depict the likely relationships that may exist amongst FM variables especially in the course of running any hotel organization driven by facilities management principles as depicted in Figure 6.

#### **4.0 A Priori Expectations of the Impact of Facilities Management**

The expected outcomes of the relationships of the identified variables of FM principles being used to run the hotels are summarized as a priori expectations and expressed in hedonic models as follows:

##### **A Priori 1**

Hotels that are fully equipped with facilities in accordance with national standard are better-off in terms of effectiveness than under-equipped hotels. In this case, effectiveness which could be designated (€) is a function of facilities; which is a dependent variable while facilities' which

could be designated ( $F_c$ ) constitutes an independent variable. Thus, mathematically,

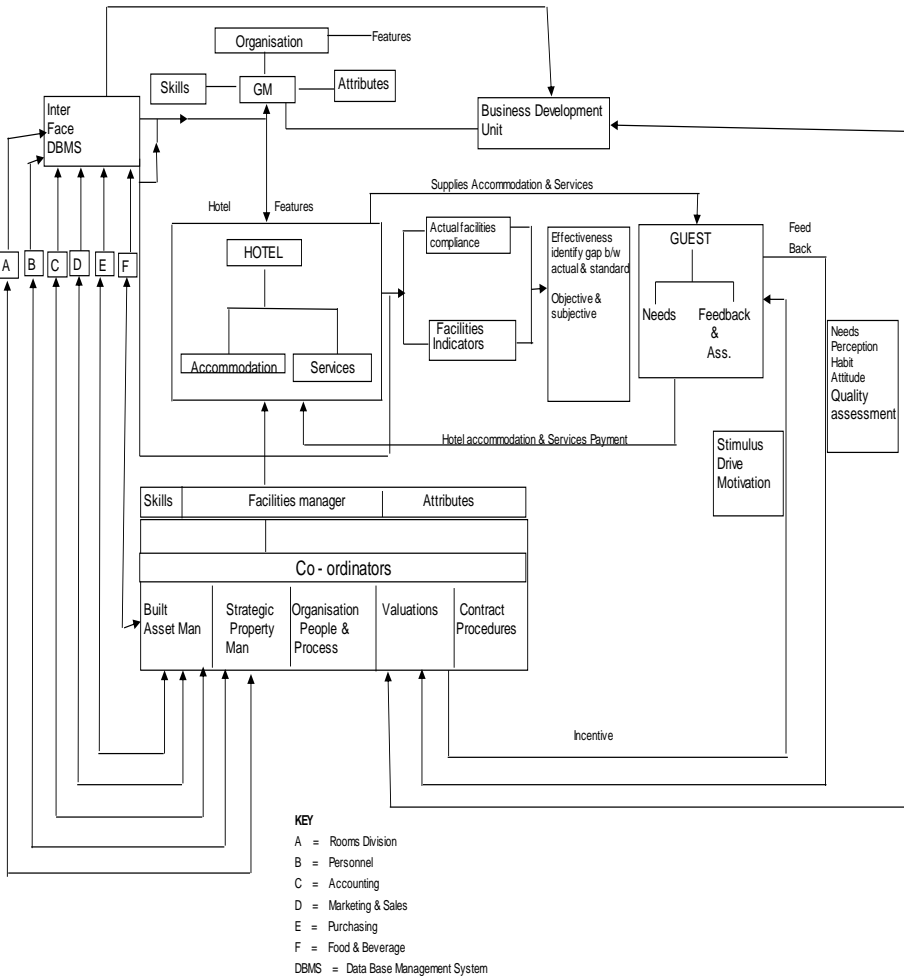
$$E = f(F_c) \dots \dots \dots (i)$$

Effectiveness in hotel organizations is influenced by Hotel traits or features; while the Management is symbolized by the General Manager; the Facilities Manager and the Staff; which are designated as:  $h_t$ ,  $g_m$ ,  $f_m$  and  $s_f$ .

Hotel organizations that implement proactive management style differ significantly in terms of effectiveness from those whose management style is reactive. In this case effectiveness is a function of management style. Effectiveness is a dependent variable while management style is an independent variable; thus, mathematically:

$$E = f(M_s) \dots \dots \dots (ii)$$

**A Priori 2**



**Fig. 6:** Conceptual Model of Facilities Management Driven Hotel Organizations

Management style in this case is the style employed in managing the facilities to realize the objectives of the organization. This may be maintenance management, property management, or facilities management. The management style is assigned the following symbol:  $m_m$ ,  $p_m$ , and  $f_m$ ; where  $m_m$  = Maintenance Management;  $p_m$  = Property Management and  $f_m$  = Facilities Management. However,  $f_m$  is a function of proactive management, management of support services and commitment to information and telecommunication technology.

Thus,  $f_m = f(m_p, s_s, I_{ct}) \dots \dots \dots$  (iii)

**A Priori 3**

(iii) Hotels having quality and quantity accommodations to sell tend to be more effective than hotels with poor and paucity accommodations; thus,

$\epsilon = f(A_c) \dots \dots \dots$  (iv)

**A Priori 4**

(iv) Hotels having a large flock of inquisitive, selective and high quality conscious customers tend to be more effective than hotels with little flock of docile and tasteless customers. Thus,

$\epsilon = f(C_s) \dots \dots \dots$  (v)

Thus, overall,  $\epsilon = f(F_c, A_c, C_s, M_s) \dots \dots \dots$  (vi)

Since  $M_s$  can either be  $m_m$ ,  $p_m$  or  $F_m$  then  $F_m$  as a management tool is picked  $\dots \dots \dots$  (vii)

Substituting (iii) and (vii) in (vi), then

$\epsilon = f(F_c, A_c, C_s, m_p, s_s, I_{ct}) \dots \dots \dots$  (viii)

**5.0 Research Method**

This is a survey research covering South-Western States of Nigeria namely Lagos, Ogun, Oyo, Ondo, Ekiti and Osun States with particular focus on the state capitals. Two to five ‘star’ hotels and conforming to NTDC grading were considered. Stratified sampling technique was adopted to select the samples while appropriate sample size was determined following the formula given by Kothari (1978). In order to secure representative responses, the size of the sample of hotels for the study should not fall below the representative size determined from statistical estimation theory, which is based on the degree of confidence that the researcher wishes to employ (Kothari, 1978). For this study, the researcher defines how large a sample of hotels should be in order to be 95% confident that the probable error of using a sample rather than surveying the whole population will not exceed 0.02%. The following formula is given

$$n = \frac{Z_{\alpha^2} N \hat{p}(1 - \hat{p})}{(N - 1)\delta^2 + Z_{\alpha^2} \hat{p}(1 - \hat{p})}$$

Where:

$n$  = Sample Size

$Z_{\alpha}$  = A value such that the probability of a normal variable

exceeding it is  $(1 - \alpha )/2$  and obtainable from Z Table. In this case 1.96

$\hat{p}$  = Unknown value we are

trying to estimate and taken to be 0.5 conservatively in which case N will be maximum and the sample will yield at least the desired precision.

$\delta$  is the true value of  $\beta$  which in this case is 0.02 or 2%

In this case, the formula yields 57. Thus, a sample size of 57 was obtained and this figure was split among the States based on the number of hotels within each State. Out of the fifty-seven questionnaires administered on hotel organizations, twenty-eight (49%) were retrieved while in respect of customers, six hundred and seventy-one questionnaires were administered from which three hundred and sixty (54%) were retrieved. Data analysis was carried out using descriptive statistics and Chi-Square ( $\chi^2$ ).

### 6.0 Working the Variables and Validating the Conceptual Model

There is the need to explore the relationships between the identified variables (if any) through crosses tabulations using Chi- square ( $\chi^2$ ) and in the process validate, reject or amend equation (viii). In order to achieve this, level of hotel effectiveness, level of facilities; quality of hotel accommodation, customer structure, prevailing property assets management style and staff quality among others were determined. For instance Table 2 shows the degree of assessed hotel effectiveness and level of available facilities in studied hotels. Table 2 gave birth to Appendix 1 which shows the cross tabulation between hotel effectiveness and facilities intensity in investigated hotels as observed scenario. From Appendix 1 is derived Appendix 2 which shows the cross tabulation between hotel effectiveness and facilities intensity in investigated hotels as expected scenario.

**Table 2:** Degree of Assessed Hotel Effectiveness and Level of Available Facilities

S/No	Hotel	Effectiveness Level	Assigned Value(X)	Ranking	Level of Facilities	Assigned Value(Y)	Ranking
1	Mainland	Effective	3	2	Intensive	4	2
2	Federal Palace	In-effective Higly	2	3	Highly Intensive	5	1
3	Sheraton	Effective	4	1	Highly Intensive Somewhat	5	1
4	West End	Ineffective	2	3	Intensive Somewhat	3	3
5	Olujoda	In-effective	2	3	Intensive	3	3
6	Owena	Higly	4	1	Somewhat	3	3

		Effective			Intensive		
7	Niger Palace	Poor	1	4	Sparse	2	4
8	Gateway	Effective	3	2	Highly Intensive	5	1
9	Hotel Plaza	In-effective	2	3	Sparse	2	4
		Higly					
10	L'eko Meridien	Effective	4	1	Highly Intensive	5	1
11	Excellence	Effective	3	2	Intensive	4	2
12	Kilo	In-effective	2	2	Intensive	4	2
13	Oasis	Poor	1	4	Sparse	2	4
					Somewhat		
14	Newcastle	Poor	1	4	Intensive	3	3
					Somewhat		
15	Bluenet	In-effective	2	3	Intensive	3	3
16	Lagos Airport	Effective	3	2	Highly Intensive	5	1
17	Lafia	Effective	3	2	Intensive	4	2
18	Heritage	Poor	1	4	Poor	1	5
		Higly					
19	Premier	Effective	4	1	Highly Intensive	5	1
20	Universal	Poor	1	4	Poor	1	5
21	Greenspring	In-effective	2	3	Sparse	2	4
22	MicCom Golf	Effective	3	2	Highly Intensive	5	1
					Somewhat		
23	D'Erovan	In-effective	2	3	Intensive	3	3
24	Kankanfo	In-effective	2	3	Highly Intensive	5	1
25	Adesba	Poor	1	4	Sparse	2	4
26	K.S Motel	In-effective	2	3	Poor	1	5
27	Dusmar	In-effective	2	3	Poor	1	5
28	Leisure Spring	Effective	3	2	Poor	1	5

Using the Chi squared ( $\chi^2$ ) test for Tables 3 and 4 above, ( $\chi^2$ ) calculated gives 25.94 as against ( $\chi^2$ ) tabulated, which gives 21.03 at 12 degrees of freedom and 5% level of significance. There is thus no close association between degree of effectiveness and level of available

facilities at the 5% of significance. Thus, increasing the level of facilities might not translate to high level of effectiveness in hotel management. In a similar manner, other relationships explored and tested are reflected in Table 3

Table 3: Summary of Variables' Relationship Exploration

S/No	Dependent Variable (Y)	Independent Variable (X)	Chi Squared $X^2_{cal.}$	Chi Squared $X^2_{tab.}$	Degree of Freedom	Level of Significance	Decision
1	Hotel Effectiveness	Hotel Facilities	25.94	21.03	12	5%	No Association
2	Hotel Effectiveness	Hotel Accommodation	12.37	16.92	9	5%	Association Exists
3	Hotel Effectiveness	Customer Structure	8.68	21.03	12	5%	Association Exists
4	Hotel Effectiveness	Asset Management Style	18.17	16.92	9	5%	No Association
5	Staff Quality	Hotel Facilities	11.02	21.03	12	5%	Association Exists
6	Staff Quality	Hotel Accommodation	10.25	16.92	9	5%	Association Exists
7	Staff Quality	Customer Structure	14.11	21.03	12	5%	Association Exists
8	Staff Quality	Asset Management Style	14.4	16.92	9	5%	Association Exists
9	Hote Traits	Hotel Facilities	12.54	21.03	12	5%	Association Exists
10	Hote Traits	Hotel Accommodation	3.47	21.03	12	5%	Association Exists
11	Hote Traits	Customer Structure	4.62	21.03	12	5%	Association Exists
12	Hote Traits	Asset Management Style	7.8	21.03	12	5%	Association Exists
13	General Manager's Traits	Hotel Facilities	18.49	21.03	12	5%	Association Exists
14	General Manager's Traits	Hotel Accommodation	22.13	16.92	9	5%	No Association
15	General Manager's Traits	Customer Structure	16.05	21.03	12	5%	Association Exists
16	General Manager's Traits	Asset Management Style	15.37	16.92	9	5%	Association Exists
17	Facilities Manager's Traits	Hotel Facilities	17.87	21.03	12	5%	Association Exists
18	Facilities Manager's Traits	Hotel Accommodation	7.95	16.92	9	5%	Association Exists
19	Facilities Manager's Traits	Customer Structure	24.89	21.03	12	5%	No Association
20	Facilities Manager's Traits	Asset Management Style	14.04	16.92	9	5%	Association Exists
21	Hotel management's Traits	Hotel Facilities	10.45	26.3	16	5%	Association Exists
22	Hotel management's Traits	Hotel Accommodation	5.76	26.3	16	5%	Association Exists
23	Hotel management's Traits	Customer Structure	7.23	26.3	16	5%	Association Exists
24	Hotel management's Traits	Asset Management Style	3.29	26.3	16	5%	Association Exists

Source: Field Survey 2007/2008

Based on the findings as reflected in Table 3, the conceptual model, as shown in Figure 6 is re-drawn as shown in Figure 7 to reflect changes where no relationship exists as shown in Table 3 and this model stays and shows that for effective hotel, there must be present, in organized relational form, an effective organization, a

proactive general manager; effective data base management system (DBMS)), a management style (Maintenance management, Property management or Facilities management), quality accommodation and facilities. Others include quality staff and highly inquisitive and quality conscious customers. This is

transformed mathematically as shown below:

$$C = f(F_c, A_c, C_s, M_s) \dots \dots \dots (vi)$$

But since  $M_s = F_m \dots \dots \dots (vii)$  and

$$F_m = f(m_p, s_s, I_{ct}) \dots \dots \dots (iii)$$

Substituting (iii) and (vii) in (vi), then

$$C = f(F_c, A_c, C_s, F_m) \dots \dots \dots (viii)$$

Now, it could be proposed that

$$C = F_c + A_c + C_s + M_s \dots \dots \dots (ix)$$

From the findings, the following radical alterations are implemented.

First, there is no linear association between hotel effectiveness and hotel facilities. That means facilities could be expunged as independent variable. This only proves the point made by Bevan (1991) that facilities are augmented assets put in place to sell accommodation, the primary products of hotel organizations. Thus, the fundamental alteration to the equation is that  $F_c$  goes or  $A_c$  is re-written as  $(A+F)_c$ . Since facilities are defined as inclusive of accommodation ( $A_c$ ) and support services ( $S_s$ ),  $F_c$  could also replace  $A_c$  or vice versa.

Second, there is a linear relationship between hotel effectiveness and hotel accommodation and so accommodation stays. There is also a linear relationship between hotel effectiveness and customer structure and so this also stays. There is no linear relationship between hotel effectiveness and management style which implies that either maintenance

management or property management could replace facilities management. Since there is linear relationship between staff quality, the general managers ( $g_t$ ) and facilities managers' ( $f_{mt}$ ) traits, it is the drive and commitment to these modes of management style and this point is buttressed by the fact that there is linear relationship between hotel management ( $h_m$ ) and facilities, accommodation, management style and customer structure.. Besides, Staff qualities ( $s_q$ ), hotel traits ( $h_t$ ), general manager ( $g_t$ ) traits and facilities manager ( $f_{mt}$ ) traits which are all sub elements of hotel effectiveness ( $C$ ) have linear relationships with hotel facilities. Thus,  $F_m$  stays. It does imply that equation (ix) above could be re-written as follows:

$$C = A_c + C_s + F_m \dots \dots \dots (xi)$$

Substituting components of  $C$  then (ix) becomes

$$S_q + h_m + h_t + g_t + f_{mt} = A_c + C_s + F_m \dots \dots \dots (xii)$$

$$F_m = s_q + h_m + h_t + g_t + f_{mt} - (A_c + C_s) \dots \dots \dots (xiii)$$

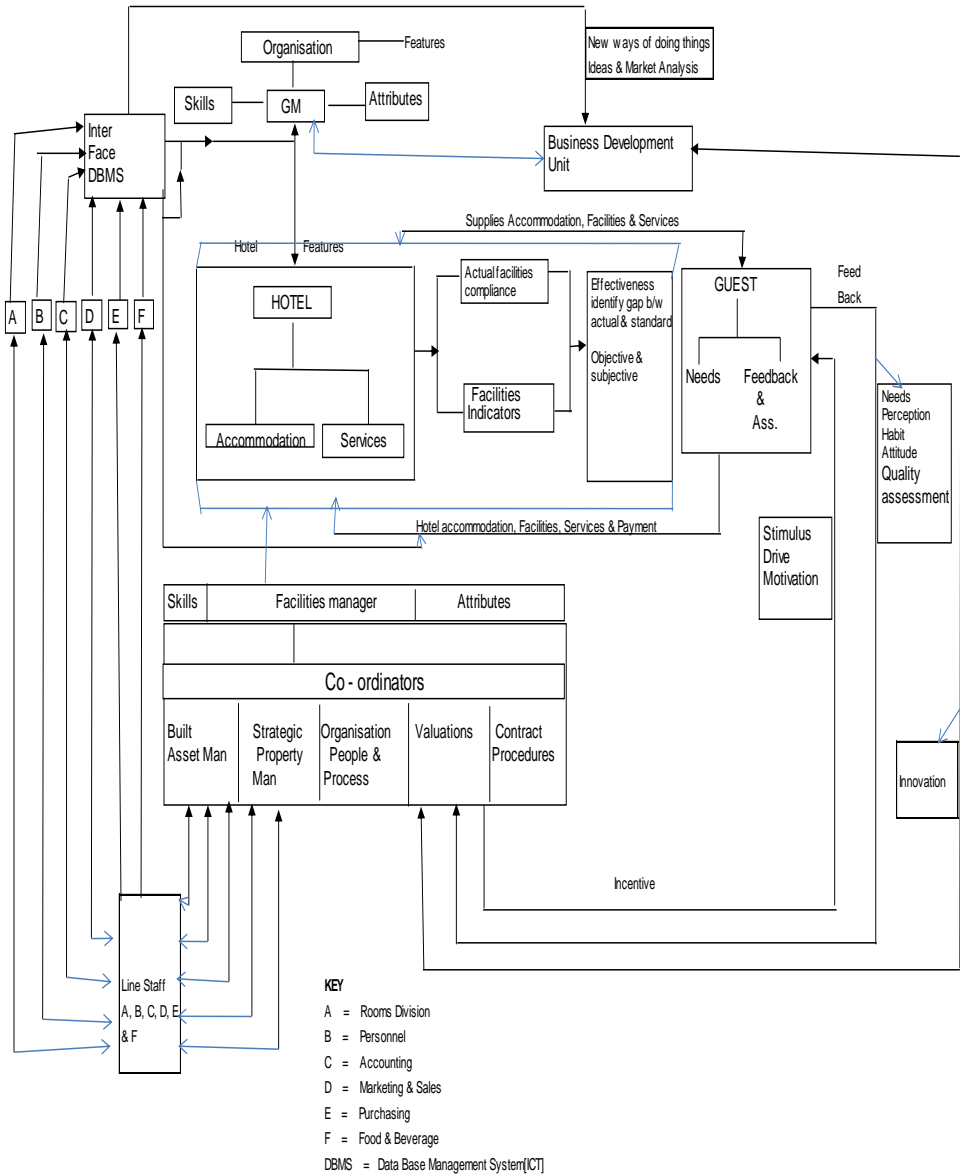
Since there is no linear relationship between facilities management traits and customer structure,  $C_s$  becomes zero and therefore (xiii) becomes

$$F_m = s_s + h_m + h_t + g_t + f_{mt} - A_c \dots \dots \dots (xiv)$$

Since  $A_c$   $A_c$  is what is being managed or sold, it remains a constant and could be assigned 1 (one) thus (xiv) becomes



$$F_m = s_q + h_m + h_t + g_t + f_{mt} - 1 \dots \dots \dots (xv)$$



**Figure 7: Validated Conceptual Model of Facilities Driven Hotel Organizations**

This mathematical hedonic model (xv), as it is, stays. This translates the conceptual graphic model in

Figure 7 to a mathematical hedonic model.

## **7.0 Conclusion and Recommendation**

A validated heuristic graphic model, translated to a mathematical hedonic model for facilities management driven hotel has been generated incorporating all vital variables necessary and imperative for an effective hotel organization. This model is a useful tool for hotel operators embarking on strategic asset management in order to revitalize their set up. It is also useful for regulatory authorities and grading institutions as a template

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against which available facilities' can be benchmarked. It is accepted that this model is not a cracker-barrel instrument and at infant stage, yet, a serendipity. One sure area that may need further research is the cost implication of adopting FM as against property management or maintenance management and what level of hotel should each be appropriately employed. Hence, praise, knock and constructive criticisms are welcome.

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**Appendix 1:** Cross Tabulation of Effectiveness and Customer Structure(Observed Scenario)

	1	2	3	4	5	
1	3	0	1	0	0	4
2	3	4	0	0	1	8
3	2	0	4	2	2	10
4	0	0	1	3	2	6
	8	4	6	5	5	28

**Appendix 2:** Cross Tabulation of Effectiveness and Customer Structure(Expected Scenario)

	1	2	3	4	5	
1	1.142857143	0.571429	0.85714	0.714285714	0.714286	4
2	2.285714286	1.142857	1.71429	1.428571429	1.428571	8
3	2.857142857	1.428571	2.14286	1.785714286	1.785714	10
4	1.714285714	0.857143	1.28571	1.071428571	1.071429	6
	8	4	6	5	5	28

The Chi- Square calculation as generated is thus shown below.

Chi Squared Calculations		
O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
1.857142857	3.449	3.0179
0.714285714	0.5102	0.2232
-0.857142857	0.7347	0.2571
-1.714285714	2.9388	1.7143
-0.571428571	0.3265	0.5714
2.857142857	8.1633	7.1429
-1.428571429	2.0408	1.4286
-0.857142857	0.7347	0.8571
0.142857143	0.0204	0.0238

-1.714285714	2.9388	1.7143
1.857142857	3.449	1.6095
-0.285714286	0.0816	0.0635
-0.714285714	0.5102	0.7143
-1.428571429	2.0408	1.4286
0.214285714	0.0459	0.0257
1.928571429	3.7194	3.4714
-0.714285714	0.5102	0.7143
-0.428571429	0.1837	0.1286
0.214285714	0.0459	0.0257
0.928571429	0.8622	0.8048
		25.937

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