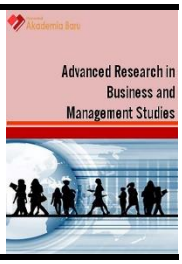
Penerbit Akademia Baru

Journal of Advanced Research in Business and Management Studies

Journal homepage: www.akademiabaru.com/arbms.html
ISSN: 2462-1935



Systematic Review on the Attributes of Resident Satisfaction Measurement in the Facility Management Context

Open Access

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ABSTRACT

Resident satisfaction with the building maintenance services rendered by the property management company is vital to the quality of people's life in the residential buildings. Resident satisfaction measurement generally depends on the service quality of the building maintenance services offered by the property management company. However, there were too many attributes that have influenced resident satisfaction, as highlighted in previous research. In fact, some of them were duplicated and redundant. Thus, the aim of this paper is to identify and simplify the attributes that contribute to resident satisfaction in the building maintenance services. For this purpose, the researchers carried out a systematic review of the most recent articles from 2009 to 2019. Researchers also have considered a few articles before 2009 with the opinion that articles were useful to support the present study. Researchers conducted content analysis by systematically analysing and reviewing previous research publications on service quality dimensions used for users' satisfaction measurement in the facility management context. Past researches have reported on 45 service quality dimensions that have been considered for users' satisfaction evaluation in the facility management field. The findings showed that the identified attributes suggested in the previous works in the facility management field were for a specific and different types of building. In this paper, the researchers suggest a comprehensive range of 18 service quality dimensions including cleanliness, general maintenance and assurance service quality dimension that are useful for measuring resident satisfaction with building maintenance services of the high-rise residential buildings. This finding will benefit the property management companies with valuable information on the attributes that they could rely on to measure resident satisfaction towards building maintenance services. In fact, it provides a clear understanding of service quality dimensions and facilitates future researchers on the appropriate attributes to be considered in evaluating resident satisfaction with the high-rise residential building maintenance services in their future research.

Keywords:
Satisfaction Measurement, Facility Management

Received: 7 October 2020 **Revised: 6 December 2020** **Accepted: 15 January 2021** **Published: 26 January 2021**

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https://doi.org/10.37934/arbms.21.1.2739

1. Introduction

Residential satisfaction with facility management in the built environment has received some attention from researchers in previous studies. However, the discussion on the resident satisfaction attributes appeared to be slightly different due to the nature and scope of previous studies. The various approaches to resident satisfaction measurement that have been suggested and applied in past studies have become one of the factors contributing to these differences. In fact, resident satisfaction measurement studies involved different types of residential housing such as public housing [1], public low-cost housing [2-4], private buildings [5], public and private high rise residential buildings [6] and residential apartment buildings [7].

In addition to these different types of residential housing scope, the satisfaction measurement related to the facility management have also involved certain types of built environment such as public hospital [8], office buildings [9], commercial office properties [10], industrial buildings [11], care and attention homes [12], bus terminal buildings [13], public educational buildings [14], university [15], school [16], shopping mall sector [17] and national park [18]. The residential satisfaction was also measured from the viewpoint of various respondent groups such as residents, building maintenance contractors [19, 20], outsourcing firm [8, 21] and private apartment companies [22]. In addition, the respondent from the residents' group also consisted of different set of group likes owners, tenants [23], housing owner's frontline representatives [19] and the migrant workers [1]. These wide ranges of the studies' scope and nature carried out by the previous researchers have greatly contributed to a broad discussion on the satisfaction measurement of the facility management in the corresponding built environment.

Li [24] addressed that the issues associated with the resident satisfaction attributes suggested in previous studies may have different influences on the resident's satisfaction measurement across all nations and societies, as there were limited works conducted on this topic in the developed countries. Koleoso, Omirin [25] also acknowledged that minimal studies had been carried out regarding the facilities performance measurement particularly in relation to the office built environment. In addition, Koleoso, Omirin [25] suggested that the relevant resident satisfaction attributes or parameters should be used in the facility management measurement activities in order to produce a consistent result and avoid any misunderstandings or errors. In recent years, researches on residential satisfaction have drawn attention in Malaysia. These current researches on residential satisfaction measurement focused on different measurement factors, for instance, housing unit facilities, maintenance management services of the housing unit, general amenities, social environment [2], neighbourhood features which consisted of social activities, children well-being, safety, security, green environment, serenity, mobility [26], lift maintenance [27], building quality [28] and community facilities [26, 29]. The findings from the literature review conducted on previous researches indicated that there were several different factors that influenced residents' satisfaction towards facility management services provided in the residential buildings. Therefore, this paper intends to systematically review and discuss previous researches on the resident's satisfaction attributes in view of service quality dimensions in the facility management context from the residents' perspective.

1.1 Facility Management

Facility management (FM), as defined by the International Facility Management Association (IFMA) is a profession that encompasses multiple disciplines to ensure the functionality of the built

environment by integrating people, place, process and technology [30]. The definition from the other professional bodies, namely the Institute of Workplace and Facilities Management (IWFM) is slightly different, which defined facility management as an organisational function which integrates people, place and process within the built environment to improve the quality of life of people and the productivity of the core business [31, 32]. This definition of facility management from IWFM was adopted from the International Organization for Standardization [33]. While in Malaysia context, FM was described as "the total management that integrates all services to support the core business of an organisation" by the Malaysian Association of Facility Management (MAFM) [34].

Facility management practices in the housing sector is vital to improve people's daily life as well as to increase the quality of residents' activities in their residential areas [35]. Maintenance management services which are part of the facility management activities are rendered to preserve, repair and enhance every aspects of the building including its facilities and areas in an acceptable condition. According to the Chartered Institute of Building, building maintenance is required to maintain, repair or upgrade all facilities and services in the building and its surrounding areas to an acceptable standard, as the building begins to age after completion and put into use [36, 37]. The present state of the building with high quality working environment is important for the residents. Therefore, maintenance activities are required [38], to the extent that the building is ready for the occupants to use their functions accordingly [39]. Soh *et al*., [40] added that the designs and the practices of building maintenance operations should be effective as any other organisation's operational functions in order to maximise productivity value derived from the building properties and their related services. The maintenance results and the occupants' satisfaction is undoubtedly influenced by day-to-day inspection and maintenance activities [35]. Therefore, in order to allow the building occupants reside in a safe living environment, it is necessary to ensure that maintenance activities are carried out properly in that building [41].

1.2 Resident Satisfaction

Satisfaction studies have been carried out in a variety of disciplines such as management, social sciences and built environment [42]. In the context of the residential built environment, satisfaction is defined as an assessment that is based on the difference between the actual and expected housing needs and desires of the residents [43]. Salleh [44] also agreed with the notion that residents' decisions are based on their needs and expectations and therefore the residential satisfaction was referred as an evaluation of disparities between the actual and desired housing of the residents. This view was also consistent with Ibem *et al*., [45], who claimed that users' satisfaction with housing units was based on a measure that residential buildings' efficiency satisfies their needs and expectations. Similarly, in the study by Mohit *et al*., [2] and Mohit and Raja [46] stated that residential satisfaction is a sense of satisfaction when one has or accomplish what one needs or wants in a house. However, McCray and Day (as cited in [46]) referred housing satisfaction as the degree of happiness a person or a family member experienced with the current housing situation. In other words, resident satisfaction can be explained as an expression of residents' feelings about the building [47]. Nonetheless, it was different from Jiboye [48] study, which explained that the concept of residential satisfaction was represented by the degree to which residents believe that their housing assists them to achieve their objectives. Meanwhile, in the context of building maintenance management services, resident satisfaction was clarified as the residents' impression of their property and the impact of facilities and maintenance on their life in the building and surrounding areas [22, 49].

1.3 Resident Satisfaction Measurement

In the existing academic papers, there were a variety approaches to measure resident satisfaction. For instance, there were residential satisfaction measurement that focused on the housing conditions [2, 42], neighbourhood features [2, 26, 42], management aspects [42], dwelling unit support services [2], the service quality of the facility management [6], building maintenance management services [23], and community facilities [29]. While the other measurement of resident satisfaction suggested by Seshadhri and Paul [50] was based on the user requirements that reflect building performance attributes. Ibem and Aduwo [42] measured the resident satisfaction by Mean Attribute Scores (MAS) approach on the residential environment such as dwelling unit features, dwelling unit support services, neighbourhood environment, and management of housing estates. While Mohit, Ibrahim [2] measured the resident satisfaction by using Residential Satisfaction Index on the five components of variables, which are dwelling unit features, dwelling unit support services, public facilities, social environment, and neighbourhood facilities. In contrast, Olanrele, Ahmed [6] measured the resident satisfaction on the facility management service delivery by using service quality approach. The service quality approach was also adopted by Lai and Lai [23] to measure users' satisfaction on the building maintenance in public housing. Besides that, according to Lai and Lai [23] and Lai and Pang [19] resident satisfaction measurement was also related to the assessment of the maintenance contractor service quality. On the other study, Sivanathan *et al*., [4] using the Habitability Index Analysis to measure resident satisfaction based on the building services factors, physical and environment factors and building maintenance management factors.

1.4 Service Quality

Facility management is considered as one of the service industry fields [32], and building maintenance service is part of the services provided in the facility management activities [51]. Customer satisfaction in the services industry relies on the level of service quality of the company [52], and the occupant satisfaction was said to be influenced by the delivering maintenance services provided by the FM-related employees [51]. Sia, Yew [41] also agreed that the extent of residents' satisfaction with the building depends on the quality of the provided facilities and maintenance services. Thus, Li and Siu [53] suggested Service Quality (SERVQUAL) approach in the evaluation of resident satisfaction towards building maintenance management services quality in the public housing. Baharum, Nawawi [54] also agreed that one of the basis for service quality assessment in the facility management context was customers' expectations on the services to be provided by the property management company.

Parasuraman, Zeithaml [55] initially established the SERVQUAL model to measure service quality, and on how the level of services delivered corresponds to customer's expectations [56] by using service quality gap analysis [55]. The service quality gap and the level of consumer satisfaction was determined by the discrepancy between consumers' perceptions and expectations [6]. From the previous literature review, many organisations have widely adopted this SERVQUAL model to measure service quality of their activities with some modification on the service quality dimensions items were made to fit with their purpose [57-59].

2. Research Methodology

The authors carried out a systematic literature review on the service quality of resident satisfaction measurement towards the building maintenance management services following a previous comprehensive search by Palmarini *et al*., [60] and Tranfield *et al*., [61]. Seven processes included in this systematic literature review by Palmarini *et al*., [60] which were planning, defining the scope, searching, assessing, synthesising, analysing and writing. While, the literature review method suggested by Tranfield *et al*., [61] referred to the process of collecting, selecting, analysing and classifying of relevant published articles. The authors appropriately adopted some of the process proposed by these previous scholars in three stages of academic papers screening on the resident satisfaction measurement topics.

In the first stage, the authors planned to identify the academic papers through a database search, which focussed on the use of Web of Science (WoS), Scopus, Emerald, and Google Scholar database search engine. WoS and Scopus have been widely used in academic papers which involved researchers from more countries and knowledge fields who were interested in the use of these two databases [62]. Furthermore, WoS and Scopus were reported to have greater coverage and accuracy on the published academic papers. The first stage of database search strategy began with academic papers published from January 2009 to December 2019, which cover all types of journal publications. The database search was restricted from 2009 to 2019 due to the rapidly evolving nature of the facility management topic. The keyword search terms used to identify the related academic papers in this initial search included resident satisfaction, user satisfaction, satisfaction measurement, facility management, facility maintenance management performance, building maintenance services, building maintenance management performance, maintenance management performance, service quality, residential building, and other relative keywords in order to ensure that no academic papers with high relevancy were left out. In this database search, the authors considered only document types of articles and proceeding papers (in WoS) or conference papers (in Scopus). This step was much less time consuming as it did not require reading the titles or the abstracts contained in the documents. The main purpose in this stage was to testify the level of research attention paid to residential satisfaction measurement in facility management topic as well as to establish study boundaries, so the search result was only helpful in presenting the number of resident satisfaction measurement publications.

In the second stage, the authors evaluated the title and abstract of the academic papers found through database searches. The authors focused completely on resident satisfaction studies published in English due to the large number of abstracts and only English language proficiency within the research team. Each abstract has been reviewed twice for inclusion. Although this further reduced the number of academic papers, the result may not yet be the exact output that this study seeks. In this second stage also, the authors found out that some papers merely made a passing reference to satisfaction, service quality and building management performance evaluation on other aspects such as healthcare, education and sports and recreation sector. Even they appeared to have met the search code, they were eliminated.

In the third stage, the authors were visually examined of all potential academic papers in order to identify those who met the specified criteria, and to examine the abstracts and keywords. The titles and abstracts of all academic papers have been screened for the above-mentioned search criteria. All academic papers that were deemed 'relevant', 'dubious' or 'unknown' were examined in full text. Additional studies have been identified by reading the selected academic papers in full-text. Irrelevant papers were excluded, and papers addressing attributes or service quality in the resident

satisfaction measurement in the context of facility management perspective were extracted as a target. The authors have also considered the articles of service quality in the satisfaction measurement for the office buildings due to the number of articles of service quality related to residential housing is too small. Following this, the number of service quality involved in the resident satisfaction measurement towards building maintenance services in the residential building, including office building, were explored through an in-depth content analysis of selected papers.

Article bibliographies or a list of references have also been scanned to identify additional eligible articles. Last but not least, the authors have made some comparisons with the articles resulted from the previous systematic review on the residential satisfaction questionnaire by Smrke *et al*., [63] to ensure no high relevancy of articles regarding resident satisfaction left out in this systematic literature review.

3. Findings and Discussion

Based on the defined criteria, 1111 academic papers were retrieved in the first stage of database searches through WoS, Scopus and Emerald. Four hundred two academic papers were from WoS, 574 from Scopus, 135 from Emerald and another 14 academic papers identified from bibliography reviews were from Google Scholar. After the deletion of the duplication of 6 academic papers, 1105 titles and abstracts of the academic papers were then reviewed in the second stage using the defined criteria. As a result, a total of 74 potentially academic papers were then retrieved in the second stage. Then, after a full-text review of 74 academic papers, 67 academic papers were excluded in the third stage, which resulted in 7 academic papers being deemed relevant. Out of these 7 academic papers, 5 academic papers describing service quality dimensions of residential satisfaction measurement for facility management services [6, 64, 65] and building maintenance [19, 23] in the residential building, and the other 2 academic papers related to the office buildings' property management service [54] and maintenance management [66].

Table 1 exhibits a list of academic papers resulting from aforementioned systematic extraction process based on the publication year, authors and the publication journal. The authors also identified the type of built environment in which the study was performed, the country in which the research was conducted, the type of respondents' group and the service quality dimensions/attributes used in the study. From Table 1, it was found that the researchers have defined service quality dimensions based on SERQUAL model established by Parasuraman *et al*., [55] in their studies respectively. Parasuraman *et al*.,, [55] have identified a total of five service quality dimensions in the SERQUAL model which were tangibility (No.1), responsiveness (No.2), reliability (No.3), assurance (No.4) and empathy. However, Baharum *et al*., [54] argued that the identified service quality dimensions should mainly reflect on current business in the study. Thus, the researchers [6, 54, 66] made some modifications on the original SERQUAL model meticulously to align with their studies.

Table 2 summarised the service quality dimensions identified by each of the researchers in their respective research as reported in Table 1. Table 2 reveals that the researches were conducted on various service quality dimensions in the facility management context. Lai and Pang [19], Lai and Lai [23] and Olanrele [64] considered the same service quality dimension introduced by Parasuraman, Zeithaml [55] in their study. However Hui and Zheng [65] sorted their service quality into estate management officers and their services, security guards and their services, cleaning staff and their services, management of utilities and communal facilities. In contrast, Baharum, Nawawi [54] suggested a new framework of service quality dimensions for facility management services in the

office building environment. Baharum *et al*., [54] have proposed a new Property Management Service Quality Instrument (PROPERTYQUAL) based on SERQUAL model. Besides measuring the 5 initial service quality dimensions (tangibles, reliability, responsiveness, empathy and assurance dimension) which they were grouped into functional categories, their research suggested two additional categories that should be measured, which are technical category and image category. Under the technical category, they outlined cleanliness, building services, signage, security and parking as additional dimensions to be evaluated, while the building aesthetics dimension was outlined as under image category.

Table 1
List of academic papers for resident satisfaction measurement

Year	2009	2010	2010	2011	2013	2014	2014
Authors	Baharum Z.A., Nawawi, A.H. and Saat, Z.M.	Eddie C.M. Hui and Xian Zheng	Anthony W. Y. Lai and Peggy S. M. Pang	Myeda, N.E., Kamaruzzaman, S.N. and Pitt, M.	Anthony W.Y. Lai and W.M. Lai	O.O. Olanrele, A. Ahmed and H.O. Smith	Olanrele, O.O. Thontteh,E.O.
Database	Google Scholar	Scopus	Scopus	Emerald	Scopus	Web of Science/ Scopus	Google Scholar
Journal / Conference	International Business Research	Facilities	Journal of Construction Engineering and Management	Facilities Management	Engineering, Construction and Architectural Management	MATEC Web of Conferences	Journal of Management and Sustainability
Built Environment	Office buildings	Residential property	Public Rental Housing	Office buildings	Public rental housing	Public and Private High Rise Residential Buildings	Public High Rise Residential Buildings
Countries	Malaysia	Hong Kong	Hong Kong	Malaysia	Hong Kong	Nigeria	Nigeria
Respondents	Tenants and property manager	Owners and Tenants	Housing owner's frontline representatives	Maintenance managers and building end-users	Tenants	Residents	Residents
Number of Dimensions	11	4	5	17	5	20	5

In the next few years, Myeda *et al*., [66] have designed a performance measurement system for the office building. This performance measurement system has three main categories similar to Baharum *et al*., [54] study, namely functional, technical and image category. Myeda, Kamaruzzaman [66] revealed additional 3 service quality dimensions (relevance, timeliness and validity), 7 building maintenance services dimensions (electricity, lift, landscaping, lighting, air-conditioning, sanitary, access) and 2 building images dimensions (external finishes and internal finishes) which were an enhancement from Baharum *et al*., [54] study as illustrated in Table 2. In this performance measurement design, they measured both focus groups, which were maintenance managers and end-users [59]. Overall, Myeda *et al*., [66] study unveiled the most comprehensive factors of service quality dimension for facility management. In 2014, Olanrele *et al*., [6] have expanded the attribute and services for resident satisfaction measurement based on their study into 20 attributes as listed in Table 2.

Table 2
List of service quality dimensions

No	Service Quality Dimension	[53]	[64]	[19]	[65]	[23]	[6]	[63]
1	Tangibles	/		/		/		/
2	Responsiveness	/		/	/	/		/
3	Reliability	/		/	/	/		/
4	Assurance	/		/	/	/		/
5	Empathy	/		/		/		/
6	Relevance				/			
7	Timeliness				/			
8	Validity				/			
9	Documentation						/	
10	Reception						/	
11	Resident database						/	
12	Resident privacy						/	
13	Prompt response						/	
14	Accountability						/	
15	Resident satisfaction						/	
16	Value for money						/	
17	Transparency						/	
18	24 hours service						/	
19	Estate management officers and their services		/					
20	Security guards and their services		/					
21	Cleaning staff and their services		/					
22	Management of utilities and communal facilities		/					
23	Cleanliness	/						
24	Building services	/						
25	Signage	/						
26	Security	/						
27	Parking	/						
28	Building aesthetics	/						
29	Cleaning and landscaping				/		/	
30	General maintenance				/		/	
31	Lightings				/		/	
32	Air-conditionings				/			
33	Lifts				/		/	
34	Mechanical and electrical				/			
35	Sanitary and washing facilities				/			
36	Access, signage and parking				/			
37	Safety and security				/		/	
38	External finishes				/			
39	Internal finishes				/			
40	Waste discharge						/	
41	Electricity						/	
42	Cleaning						/	
43	Water						/	
44	Refuse discharge						/	
45	Technicality						/	

From the above findings, the authors are in the opinion that there is a constraint on the interpretation of service quality dimension which has culminated in a variety of service quality dimensions being introduced in the previous studies. As a result, there is certain dimension from the authors' understanding is similar to one another across 45 service quality dimensions identified from the above systematic literature review. Therefore, in order to ensure that there is no redundancy of the service quality dimensions, further analysis should be carried out on the items within each service quality dimension or any new items added in the future to ensure the purpose of service quality dimensions are always consistent. The authors have consolidated and made classification according to the extent and purpose of the service quality dimensions. As a result, the authors have identified 18 appropriate dimensions from 45 numbers of service quality dimensions in the context building maintenance management services for the high-rise residential buildings. The 18 service quality dimensions are tangibles, reliability, responsiveness, empathy, assurance, mechanical and electrical, cleanliness, lift, safety and security, general maintenance, sanitary and plumbing, lightings, landscaping, access, signage, parking, external finishes and internal finishes.

4. Conclusion

This paper systematically explored the service quality dimension of resident satisfaction measurement from the facility management perspective and the issues that emerge in this area. For this purpose, the authors carried out a three-round literature review of the research articles published between 2009 and 2019 on the resident satisfaction measurement topic. The authors used a combination of titles, abstracts and keywords queries via Web of Science, Scopus and Emerald search engine to classify 7 relevant research articles as target publications. The content analysis was supported by a simple statistic used to present a picture of these resident satisfaction measurements.

In this paper, the authors concentrated on the service quality dimensions that underlie under resident satisfaction measurement as well as identify its limitation by properly describing the previous researchers' works on the currently observed dimensions of the service quality. Subsequently, the authors presented 18 service quality dimensions which are tangibles, reliability, responsiveness, empathy, assurance, mechanical and electrical, cleanliness, lift, safety and security, general maintenance, sanitary and plumbing, lightings, landscaping, access, signage, parking, external finishes and internal finishes to measure resident satisfaction in the residential buildings in the future. The authors also enumerated a list of service quality dimensions identified by the previous researchers, specifically related to resident satisfaction, which requires in-depth study of best practices especially in the facility management context by practitioners and academicians. Resident satisfaction measurement with the service quality dimension approach should be conducted in various types of residential buildings to facilitate standardisation, particularly when comparing residential buildings' performance. The items of service quality dimensions have been recognised may vary between the various types of residential buildings to match their building environment. However, these 18 service quality dimensions are practically appropriate for use in measuring resident satisfaction, as most residential buildings generally have common features of residential building maintenance services such as electrical and mechanical, safety and security, parking and access and property management office. The difference that existed can be attributed to the advanced technology application on the associated residential building facilities, which can also be measured as a new element under the corresponding 18 service quality dimensions.

Therefore, the authors are in the opinion that one of the studies could aim to fill the current gap and make a novel contribution on the service quality dimensions in relation to resident satisfaction measurement in the future, particularly in Malaysia. This paper, however, has also provided a systematic review on resident satisfaction measurement research in academia. This will serve as a platform for other researchers to launch themselves into this emerging new research field. Finally, practitioners or academician are cordially welcome to further explore the current or the new angle of service quality dimensions to ensure the resident satisfaction measurement in all residential buildings can be accomplished in a comprehensive and systematic manner.

Acknowledgement
The authors would like to thank Universiti Teknologi Malaysia (UTM) for sponsoring this research through research grant PY/2019/02111 (Q.K130000.2643.18J23).

References

[1] Gan, Xiaolong, Jian Zuo, Kunhui Ye, Dezhi Li, Ruidong Chang, and George Zillante. "Are migrant workers satisfied with public rental housing? A study in Chongqing, China." *Habitat International* 56 (2016): 96-102. https://doi.org/10.1016/j.habitatint.2016.05.003

[2] Mohit, Mohammad Abdul, Mansor Ibrahim, and Yong Razidah Rashid. "Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia." *Habitat international* 34, no. 1 (2010): 18-27. https://doi.org/10.1016/j.habitatint.2009.04.002

[3] Khair, Nurhayati, Hishamuddin M. Ali, Ibrahim Sipan, Nur Hafizah Juhari, and Siti Zaleha Daud. "Post occupancy evaluation of physical environment in public low-cost housing." *Jurnal Teknologi* 75, no. 10 (2015). https://doi.org/10.11113/jt.v75.5284

[4] Sivanathan, S., N. H. Juhari, N. Khair, P. Thanaraju, A. Azmi, and P. A. M. Khan. "Assessment of residents' satisfaction on building maintenance in public low-cost housing." *International Journal of Recent Technology and Engineering* 8, no. 1 (2019): 260-265.

[5] Leung, Mei-yung, Qi Liang, and Jon Pynoos. "The effect of facilities management of common areas on the environment domain of quality of life or older people in private buildings." *Facilities* (2019). https://doi.org/10.1108/F-03-2017-0030

[6] Olanrele, Olusegun Olaopin, Abubakar Ahmed, and Hakeem Olubodun Smith. "Facilities Management Service Delivery in Public and Private High Rise Residential Buildings in Nigeria: A case study of Eko Court Complex and Niger Towers." In *MATEC Web of Conferences*, vol. 15, p. 01013. EDP Sciences, 2014. https://doi.org/10.1051/matecconf/20141501013

[7] Sweis, G., R. Imam, G. Kassab, and Rateb Sweis. "Customer satisfaction in apartment buildings: The case of Jordan." *Life Science Journal* 10, no. 12s (2013): 237-245.

[8] Ikediashi, Dubem I., Stephen O. Ogunlana, and Isaac A. Odesola. "Service quality and user satisfaction of outsourced facilities management (FM) services in Nigeria's public hospitals." *Built Environment Project and Asset Management* (2015). https://doi.org/10.1108/BEPAM-03-2014-0024

[9] Hamid, A. H. A., and M. H. Othman. "Relationship between quality of building maintenance system and occupant satisfaction for office buildings." In *MATEC Web of Conferences*, vol. 10, p. 03001. EDP Sciences, 2014. https://doi.org/10.1051/matecconf/20141003001

[10] Karunasena, Gayani, Dimuthu Vijerathne, and Harsha Muthmala. "Preliminary framework to manage tenant satisfaction in facilities management service encounters." *Facilities* (2018). https://doi.org/10.1108/F-05-2016-0050

[11] Seetharaman, Arumugam, A. S. Saravanan, Nitin Patwa, and Jiann Ming Bey. "The Impact of Property Management Services on Tenants' Satisfaction with Industrial Buildings." *The Journal of Asian Finance, Economics, and Business* 4, no. 3 (2017): 57-73. https://doi.org/10.13106/jafeb.2017.vol4.no3.57

[12] Leung, Mei-yung, Jingyu Yu, and Ming LA Chong. "Impact of facilities management on the quality of life for the elderly in care and attention homes–Cross-validation by quantitative and qualitative studies." *Indoor and built environment* 26, no. 8 (2017): 1070-1090.

https://doi.org/10.1177/1420326X16662697
[13] Kwon, Suh-Hyun, Chungyoon Chun, and Ro-Yeul Kwak. "Relationship between quality of building maintenance management services for indoor environmental quality and occupant satisfaction." *Building and Environment* 46, no. 11 (2011): 2179-2185. https://doi.org/10.1016/j.buildenv.2011.04.028
[14] Is'haq, Mohammad Mohammad, Singhry Ibrahim Musa, and Tijjani Hadiza Bello. "Quality of property management service in public educational buildings in Nigeria." *Mediterranean Journal of Social Sciences* 4, no. 2 (2013): 753.
[15] Shafie, Fazira, Wan Zahari Wan Yusoff, David Martin, Soeb Pawi, Ihfa Suziella Ibrahim, Nur Fazliana Pauzi, and Norfaezah Ismail. "Facilities Management (FM) Helpdesk: User Complaint System in Higher Educational Institutions in Malaysia." In *Proceeding Paper of International Conferences on Social Sciences and Society (ICSSS 2011)*, vol. 14, p. 15. 2012.
[16] Yong, C. Y., and M. Zailan Sulieman. "Assessment of building maintenance management practice and occupant satisfaction of school buildings in Perak, Malaysia." *Jurnal Teknologi* 75, no. 5 (2015). https://doi.org/10.11113/jt.v75.4995
[17] Hui, Eddie CM, Pei-hua Zhang, and Xian Zheng. "Facilities management service and customer satisfaction in shopping mall sector." *Facilities* (2013). https://doi.org/10.1108/02632771311307070
[18] Barić, Demir, Petra Anić, and Ana Macías Bedoya. "Combining benefit-sought segmentation and service quality gap analysis: Case study of Paklenica National Park, Croatia." *Tourism: An International Interdisciplinary Journal* 64, no. 1 (2016): 7-25.
[19] Lai, Anthony WY, and Peggy SM Pang. "Measuring performance for building maintenance providers." *Journal of construction engineering and management* 136, no. 8 (2010): 864-876. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000191
[20] Zulu, Sambo, and Nicholas Chileshe. "Service quality of building maintenance contractors in Zambia: A pilot study." *International Journal of Construction Management* 10, no. 3 (2010): 63-81. https://doi.org/10.1080/15623599.2010.10773150
[21] Mar Iman, Abdul Hamid, Muhammad Umbugala Douglas, and Hishamuddin Mohd Ali. "Company's performance self-assessment (CoPSA) among facilities outsourcing firms in malaysia: a focus on service delivery." *International Journal of Strategic Property Management* 19, no. 3 (2015): 283-296. https://doi.org/10.3846/1648715X.2015.1054920
[22] Rahman, Muhammad Sabbir, Bashir Hussain, ANM Meshquat Uddin, and Nazrul Islam. "Exploring residents' satisfaction of facilities provided by private apartment companies." *Asia Pacific Management Review* 20, no. 3 (2015): 130-140. https://doi.org/10.1016/j.apmrv.2014.12.012
[23] Lai, Anthony WY, and W. M. Lai. "Users' satisfaction survey on building maintenance in public housing." *Engineering, Construction and Architectural Management* (2013). https://doi.org/10.1108/ECAM-06-2011-0057
[24] Li, Jintao, Dezhi Li, Xin Ning, Jun Sun, and Hua Du. "Residential satisfaction among resettled tenants in public rental housing in Wuhan, China." *Journal of Housing and the Built Environment* 34, no. 4 (2019): 1125-1148. https://doi.org/10.1007/s10901-019-09667-x
[25] Koleoso, Hikmot Adunola, Modupe Moronke Omirin, and Yewande Adetoro Adewunmi. "Performance measurement scale for facilities management service in Lagos-Nigeria." *Journal of Facilities Management* (2017). https://doi.org/10.1108/JFM-04-2016-0015
[26] Sedaghatnia, Sepideh, Hasanuddin Lamit, Amir Ghahramanpouri, and S. Mohamad. "An evaluation of residents' quality of life through neighborhood satisfaction in Malaysia." *Environmental Management and Sustainable Development* 2, no. 1 (2013): 114-125. https://doi.org/10.5296/emsd.v2i1.3254
[27] Au-Yong, Cheong Peng, Nur Farhana Azmi, and Nur Aaina Mahassan. "Maintenance of lift systems affecting resident satisfaction in low-cost high-rise residential buildings." *Journal of Facilities Management* (2018). https://doi.org/10.1108/JFM-04-2017-0015
[28] Sulaiman, Zamharira, Azlan Shah Ali, and Faizah Ahmad. "Abandoned housing project: Assessment on resident satisfaction toward building quality." *Open House International* (2012). https://doi.org/10.1108/OHI-03-2012-B0008
[29] Karim, Hafazah Abdul. "The satisfaction of residents on community facilities in Shah Alam, Malaysia." *Asian Social Science* 4, no. 11 (2008): 131-137.

https://doi.org/10.5539/ass.v4n11p131

[30] Asbollah, Asra Zaliza, Nordiana Mohd Isa, and Syahrul Nizam Kamaruzzaman. "Sustainability and the facilities management in Malaysia." In *MATEC Web of Conferences*, vol. 66, p. 00085. EDP Sciences, 2016. https://doi.org/10.1051/matecconf/20166600085

[31] Ibrahim, Ihfasuziella, Wan Zahari Wan Yusoff, and Noor Sharipah Sultan Sidi. "A comparative study on elements of space management in facilities management at higher education institutions." In *International Conference on Sociality and Economics Development. Singapore*. 2011.

[32] Bröchner, Jan. "Measuring the productivity of facilities management." *Journal of Facilities Management* (2017). https://doi.org/10.1108/JFM-04-2016-0013

[33] ISO. ISO 41011:2017 Facility management - Vocabulary 2017 [Available from: https://www.iso.org/standard/68167.html.

[34] MAFM. MAFM Now n.d. [Available from: https://www.mafm.org.my/about-us/mafm-now/.

[35] Au-Yong, Cheong Peng, Azlan Shah Ali, and Shirley Jin Lin Chua. "A literature review of routine maintenance in high-rise residential buildings." *Journal of Facilities Management* (2019). https://doi.org/10.1108/JFM-10-2017-0051

[36] Fakhrudin, Isma Haniza, Mohd Zailan Suleiman, and Roslan Talib. "The need to implement Malaysia's Building and Common Property Act 2007 (Act 663) in building maintenance management." *Journal of Facilities Management* (2011).

[37] Lee, Hackman Hon Yin, and David Scott. "Overview of maintenance strategy, acceptable maintenance standard and resources from a building maintenance operation perspective." *Journal of building appraisal* 4, no. 4 (2009): 269-278. https://doi.org/10.1057/jba.2008.46

[38] Smith, Ricky, and R. Keith Mobley. *Industrial machinery repair: best maintenance practices pocket guide*. Butterworth-Heinemann, 2003.

[39] Lateef, Olanrewaju Abdul. "Case for alternative approach to building maintenance management of public universities." *Journal of Building Appraisal* 5, no. 3 (2010): 201-212. https://doi.org/10.1057/jba.2009.19

[40] Soh, Khai Ying, Shirley Jin Lin Chua, Azlan Shah Ali, Cheong Peng Au-Yong, and Anuar Alias. "Relationship between building maintenance sourcing strategy selection factors and performance." *Journal of Facilities Management* (2019). https://doi.org/10.1108/JFM-04-2018-0026

[41] Sia, Mal Kong, Vivien Wong Chin Yew, Zhi Yong Lim, and Ye Dongqing. "Facilities and maintenance services for sustainable high-rise living." *Facilities* (2018). https://doi.org/10.1108/F-03-2017-0037

[42] Ibem, Eziyi Offia, and Egidario B. Aduwo. "Assessment of residential satisfaction in public housing in Ogun State, Nigeria." *Habitat International* 40 (2013): 163-175. https://doi.org/10.1016/j.habitatint.2013.04.001

[43] Galster, George C., and Garry W. Hesser. "Residential satisfaction: Compositional and contextual correlates." *Environment and behavior* 13, no. 6 (1981): 735-758. https://doi.org/10.1177/0013916581136006

[44] Salleh, Abdul Ghani. "Neighbourhood factors in private low-cost housing in Malaysia." *Habitat International* 32, no. 4 (2008): 485-493. https://doi.org/10.1016/j.habitatint.2008.01.002

[45] Ibem, Eziyi Offia, Akunnaya P. Opoko, Albert B. Adeboye, and Dolapo Amole. "Performance evaluation of residential buildings in public housing estates in Ogun State, Nigeria: Users' satisfaction perspective." *Frontiers of Architectural Research* 2, no. 2 (2013): 178-190. https://doi.org/10.1016/j.foar.2013.02.001

[46] Mohit, Mohammad Abdul, and Adel Mahfoud Mubarak Al-Khanbashi Raja. "Residential satisfaction-concept, theories and empirical studies." *Planning Malaysia* 12, no. 3 (2014). https://doi.org/10.21837/pmjournal.v12.i3.131

[47] Mohd, Thuraiya, Noraini Johari, and Rohaya Abdul Ghani. "Satisfaction level of gated and guarded community residents (case study: Meru Hills, Ipoh)." *Procedia-Social and Behavioral Sciences* 222 (2016): 747-754. https://doi.org/10.1016/j.sbspro.2016.05.144

[48] Jiboye, Adesoji David. "Post-occupancy evaluation of residential satisfaction in Lagos, Nigeria: Feedback for residential improvement." *Frontiers of Architectural Research* 1, no. 3 (2012): 236-243.

https://doi.org/10.1016/j.foar.2012.08.001
[49] Tan, Teck Hong. "Residential satisfaction in gated communities." *Property Management* (2016). https://doi.org/10.1108/PM-02-2015-0009
[50] Gopikrishnan, S., and Virendra Kumar Paul. "MEASURING SATISFACTION WITH USER REQUIREMENT RELATED BUILDING PERFORMANCE ATTRIBUTES: A QUESTIONNAIRE." *Journal of Building Performance* 9, no. 1 (2018).
[51] Cao, Yang, Tao Wang, and Xinyi Song. "An energy-aware, agent-based maintenance-scheduling framework to improve occupant satisfaction." *Automation in Construction* 60 (2015): 49-57. https://doi.org/10.1016/j.autcon.2015.09.002
[52] Lee, Haksik, Yongki Lee, and Dongkeun Yoo. "The determinants of perceived service quality and its relationship with satisfaction." *Journal of services marketing* (2000). https://doi.org/10.1108/08876040010327220
[53] Li, Ling Hin, and Amy Siu. "Privatising management services in subsidised housing in Hong Kong." *Property Management* (2001).
[54] Baharum, Zarita Ahmad, Abdul Hadi Nawawi, and Zainal Mat Saat. "Assessment of property management service quality of purpose built office buildings." *International Business Research* 2, no. 1 (2009): 162-174. https://doi.org/10.5539/ibr.v2n1p162
[55] Parasuraman, A., Valarie A. Zeithaml, and L. Berry. "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality." *1988* 64, no. 1 (1988): 12-40.
[56] Wisniewski, Mik. "Using SERVQUAL to assess customer satisfaction with public sector services." *Managing Service Quality: An International Journal* (2001). https://doi.org/10.1108/EUM0000000006279
[57] Kang, Gi-Du, and Jeffrey James. "Service quality dimensions: an examination of Grönroos's service quality model." *Managing Service Quality: An International Journal* (2004). https://doi.org/10.1108/09604520410546806
[58] Spencer, Robert, and John Hinks. "The significance of cognitive dissonance for the "hard and soft FM" paradigm and quality assessment practices: A whole new can of worms?." *Journal of Facilities Management* (2007). https://doi.org/10.1108/14725960710822240
[59] Nik-Mat, N. E. M., S. N. Kamaruzzaman, and M. Pitt. "Assessing the maintenance aspect of facilities management through a performance measurement system: A Malaysian case study." *Procedia Engineering* 20 (2011): 329-338. https://doi.org/10.1016/j.proeng.2011.11.174
[60] Palmarini, Riccardo, John Ahmet Erkoyuncu, Rajkumar Roy, and Hosein Torabmostaedi. "A systematic review of augmented reality applications in maintenance." *Robotics and Computer-Integrated Manufacturing* 49 (2018): 215-228. https://doi.org/10.1016/j.rcim.2017.06.002
[61] Tranfield, David, David Denyer, and Palminder Smart. "Towards a methodology for developing evidence-informed management knowledge by means of systematic review." *British journal of management* 14, no. 3 (2003): 207-222. https://doi.org/10.1111/1467-8551.00375
[62] Zhu, Junwen, and Weishu Liu. "A tale of two databases: The use of Web of Science and Scopus in academic papers." *Scientometrics* (2020): 1-15. https://doi.org/10.1007/s11192-020-03387-8
[63] Smrke, Urška, Matej Blenkuš, and Gregor Sočan. "Residential satisfaction questionnaires: A systematic review." *Urbani izziv* 29, no. 2 (2018): 67-82. https://doi.org/10.5379/urbani-izziv-en-2018-29-02-001
[64] Olanrele, Olusegun Olaopin, and Esther Oromidayo Thontteh. "FM service delivery and quality service measurement in public high rise residential buildings in Nigeria: the use of SERVQUAL and satisfaction index." *J. Mgmt. & Sustainability* 4 (2014): 145. https://doi.org/10.5539/jms.v4n3p145
[65] Amaratunga, D., U. Kulatunga, C. Liyanage, Eddie CM Hui, and Xian Zheng. "Measuring customer satisfaction of FM service in housing sector." *Facilities* (2010).
[66] Myeda, Nik Elyna, Syahrul Nizam Kamaruzzaman, and Michael Pitt. "Measuring the performance of office buildings maintenance management in Malaysia." *Journal of Facilities Management* (2011). https://doi.org/10.1108/14725961111148090