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Residents' Maintenance Priorities Preference: The Case of Public Housing in Malaysia

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Abstract

One of the most important issues in the context of urban housing concerns with maintenance management. Previous studies have shown that residents' participation in terms of reporting disrepair and monitoring building defects is an important aspect in improving the existing housing conditions and in avoiding deterioration. The objective of this study is to examine the residents' priorities on the competing maintenance demands. A face-to-face survey was conducted on the residents of public housing in Penang; one of the states with significantly developed towns in Malaysia. The respondents were selected using the stratified random sampling. The data were analysed using the descriptive analysis and Pearson product-moment correlation. The results suggest that 'work necessary to maintain the safety and health of residents', 'work necessary to keep property habitable' and 'work necessary to keep buildings operable' as the most important reasons for the requirement for maintenance. The results also show that 'electrical faults', 'sanitary appliance failure' and 'pipes linkage' are the residents' top three maintenance priority preferences. The results imply the need to apply suitable mechanisms for communication and response method in order to maintain safety and keep the property habitable.

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1. Introduction

Housing has an important influence to the well being of the people and it is a major economic asset for all nations (Olapado, 2006). According to Foster (2000), secured communities and social inclusion start with quality housing. However, it is common for any residential buildings to have to confront with the problems of building decay and deterioration, which are inevitable through the effects of usage, wear and tear (Ozdemir, 2002). In order to extend the life of the building, it is vital to have proper maintenance so that all negative effects can be reduced or eliminated (Chew *et al.*, 2004).

It is therefore not surprising that one of the most important issues in the context of urban housing relates with maintenance management. Past researchers have acknowledged strong relationships between economic deprivation, poor housing and lack of maintenance (Kangwa & Olubodun, 1999, 2003a; Leather & Rolf, 1997). According to Stewart (2003), as one of the main initiators of maintenance action, the residents' lack of awareness on maintenance work will critically lead to them living in disrepair and in an unbearable condition. Seeley (1987) argues that one of the main responsibilities of a resident is to inform relevant departments on the defects observed at their homes for

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the defects to be repaired or corrected. On the other hand, Zubedy's (2008) study has found that residents' participation in terms of reporting and monitoring building defects are two important aspects towards improving the existing housing conditions and as to avoid deterioration. Thus, to fulfill this responsibility, residents must be able to understand the severity of the observed defects or be able to anticipate the defects in the building structures and convert this understanding into actions.

There is no doubt that the residents do not possess the same level of maintenance knowledge as obtained by officers from the maintenance department or management agency who is responsible and directly involved in the maintenance work. Moreover, maintenance is a complicated operation which most residents as laypersons find difficult to perhaps understand, or to address themselves. It has been argued that the maintenance process should be based on an understanding of the building construction and followed by actions that conserve and boost the value of a building (Watt, 1999), which warrant a higher understanding of maintenance. There is a possibility that the physical deterioration of housing tends to happen due to incorrect judgment and lack of actions (Leather & Rolf, 1997). Studies have revealed that there is a close relationship between residents' prior knowledge of the type of defect mechanisms and residents' choice of maintenance strategies (Kangwa & Olubodun, 2007). This points out the need for residents to have some basic maintenance knowledge, in particular to detect maintenance problems and notify the management office before any proper action can be taken.

Looking at the extensive housing management studies, there appears to be a gap in understanding how effective maintenance management can be materialised by the role played by the residents in carrying out management activities. This study attempts to fill the gap by investigating public housing residents' maintenance management activities. In particular, this study examines the residents' priorities on the competing maintenance demands. This study seeks to answer the question of - What are the residents' priorities with regards to maintenance demands and the reasons usually given for the maintenance.

2. Building Maintenance and Residents Priority

Maintenance, as an issue, has been mentioned a great deal by many scholars in the literature. It concerns with preserving the building so that it is suitable for its use (El-Haram & Horner, 2002). It seeks to extend the life of the building elements through day-to-day work (Hills & Worthing, 2006). In addition, for safety and security (Thompson, 2004), an appropriate operation is necessary to prevent the condition of the building from continuously deteriorating (Hui, 2005). Nevertheless, due to budget constraints, maintenance actions must be reliable and economical (Flores-Colen *et al.*, 2010). Therefore, maintenance can be defined as work carried out either in the form of repairing, restoring and improving every facility to make sure the building is in good condition.

The existing condition has it that the list of priorities concerning maintenance work is determined by the maintenance department, and not the residents themselves (Oladapo, 2008). Residents' feedback is also ignored in determining housing improvement and development (Jiboye, 2010). Neglecting residents' views when determining maintenance priority is seen as able to influence residents' satisfaction on the maintenance system (Yip, 2001). What is considered as important by the residents and maintenance department may differ and the disagreement on the priority order of competing maintenance demand may result in residents' dissatisfaction over the state of repair of the building (*ibid*). This weakness has led Kangwa & Olubodun (2007) to propose the residents-led housing maintenance management as a strategy to address maintenance problems and to sustain the quality of the building. Jiboye (2010) supports this idea and argues that the quality of the building will be better if the input of the residents is considered to form part of the housing management policy. The involvement of residents in maintenance management will improve the transparency in identifying maintenance priority and subsequently increase residents' awareness on maintenance and thus, improve building quality (Shen *et al.*, 1998).

At the same time, various studies have identified awareness as the biggest barrier which contributes to most residents facing difficulties in identifying the most basic defect and its effect on the building material (Donnison, 1979). According to Kangwa & Olubodun (2006), residents' input is also problematic, since there is no clear definition on the standard which warrants repair and maintenance. Recent studies also suggest that lack of technical skills among the residents is the main obstacle for effective repair and maintenance (Kangwa & Olubodun, 2007).

Moreover, awareness that lacks among the residents has caused defect to be left unreported, which deteriorates the building further and negatively affects the residents' standard of living (Mossel & Jansen, 2010). Since the budget for maintenance is often limited, awareness must be accompanied with maintenance prioritization to meet the increasing maintenance demands (Shen *et al.*, 1998).

However, in many housing estates, residents' participation is usually a voluntary basis and many residents usually overlook the importance of their involvement in maintaining the building (Yau, 2011). It is not surprising if not much is known about residents' maintenance priority. Even for professional property managers, setting maintenance priorities has always been a problem (Shen *et al.*, 1998). Decisions on maintenance priority are based on subjective evaluation, which usually lead to inadequate resources and insufficient budget. Chew *et al.* (2004) argue that even though maintenance aims to maximise the economic value of a building, the minimum standard is set because of the reluctance of many parties to spend more to achieve the optimum standard. Among the few studies on maintenance prioritization, Flores-Colen *et al.* (2010) reveal that building users prioritise health, safety in use and functionality as the three most important aspects in maintenance, while they consider aesthetics as the least important. Mossel & Jansen (2010) come to some conflicting results as to what the residents consider as important. They use three different methods to prioritise maintenance, hoping to obtain similar results with those differing methods. All methods show that residents consider heating, water systems, hinges and locks of windows and external doors as important aspects of maintenance. If the aim is to boost residents' satisfaction, then the exterior paintwork and bathrooms should be the focus for maintenance activities. The unconvincing results justify the need for another study on residents' priority preferences on the maintenance of their residential buildings and the reasons for the maintenance.

3. Research Methodology

In order to assess maintenance priority preferences of residents in public housing, a face-to-face survey was conducted. The respondents were asked to rank the importance of various maintenance activities directly. The questionnaire includes questions on the residents' profile, the reasons for maintenance (7 items) and their maintenance priority preferences of 13 building elements. A four-point scale was used ranging from 1 = strongly agree or extremely important to 4 = strongly disagree or extremely unimportant. The population of the study consists of residents of the public housing in the state of Penang obtained from the two local authorities in that state. A simple random sampling was employed to select the respondents. In order to ensure the reliability of the data, the respondents chosen are the heads of the households. The data were analysed using the descriptive analysis and correlation test with the help of the SPSS software. Before performing the analysis, the reliability test was conducted to all items in both constructs; 'reason for maintenance' and 'maintenance priority preference', to check the internal consistency of the items used. The results show that the Cronbach's alpha for both constructs were between 0.6-0.8, which were above the acceptable minimum value of 0.5 as suggested by Hair *et al.* (2006), altogether enabling us to retain all items for the subsequent analysis.

4. Results

Table 1 shows the results of the reason of maintenance. With 1 = strongly agree and 4 = strongly disagree, in terms of the maintenance category, the respondents regard 'work necessary to maintain the safety and health of residents' as the strongest reason for maintenance with the mean score of 1.07, followed by 'work necessary to keep property habitable' (mean score 1.26) and 'work necessary to keep buildings operable' (mean score 1.26). In contrast, the residents consider 'work necessary for the appearance of the property' (mean score 2.17), and 'repair of building material' (mean score 2.37) as the least important reasons for maintenance.

Table 1. Reasons for Maintenance

Reason for Maintenance	Mean	Standard Deviation	N
Work necessary to maintain the safety and health of residents	1.07	0.260	398
Work necessary to keep property habitable	1.26	0.439	398
Work necessary to keep buildings operable	1.37	0.483	398
Emergency failure	1.40	0.623	398
Preventive maintenance	1.60	0.584	398
Work necessary for the appearance of the property	2.17	0.761	398
Repair of building material	2.37	0.776	398

Table 2 shows the results for residents’ maintenance priority preference according to building elements. With 1 = extremely important and 4 = extremely unimportant, the residents rank ‘electrical faults’ (mean score 1.11) as their most important maintenance priority preference, followed by ‘sanitary appliance failure’ (mean score 1.28) and ‘pipes linkage’ (mean score 1.34). However, the residents place the lowest ‘damaged door and windows frame’ (mean score 1.84), ‘damaged painting’ (mean score 1.75) and ‘wall tile failure’ (mean score 1.71).

Table 2. Residents’ Maintenance Priority Preference

Maintenance Priority Preference	Mean	Standard Deviation	N
Electrical faults	1.11	0.387	398
Sanitary appliance failure	1.28	0.475	398
Pipes linkage	1.34	1.141	398
Damaged ceiling	1.42	0.524	398
Damaged internal door	1.52	0.780	398
Floor tile failure	1.56	0.734	398
Damaged floor sheet	1.57	0.665	398
Damaged taps/stop valves	1.64	0.950	398
Damaged door locks	1.64	0.855	398
Blocked drain	1.70	0.843	398
Wall tile failure	1.71	0.915	398
Damaged painting	1.75	0.751	398
Damaged door and windows frame	1.84	1.022	398

Therefore, in order to show that there is a statistically significant relationship between residents’ maintenance priority preference according to building elements and the reason for doing maintenance, a correlation test using Pearson product-moment has been performed. Table 3 shows the correlation coefficient results. From the output in Table 3, the results show that the relationship between overall building elements and the reason for doing maintenance are generally significant ($p \leq 0.05$) except for the relationship between ‘damaged painting’ and reason for maintenance ($p = 0.199$). Hence, the strongest relationship and positive correlation was between the ‘pipes linkage’ and reason for maintenance [$r = 0.666$, $n = 398$, $p = 0.000$]; followed by ‘damaged door and windows frame’ and reason for maintenance [$r = 0.659$, $n = 398$, $p = 0.000$]; and ‘electrical faults’ and reason for maintenance [$r = 0.586$, $n = 398$, $p = 0.000$], with the more important building elements to the residents associated with the high level of agreement for the reason of doing the maintenance.

Table 3. Correlation Coefficient

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Pearson Correlation	1													
Sig. (2-tailed)														
2 Pearson Correlation	.087	1												
Sig. (2-tailed)	.081													
3 Pearson Correlation	.568**	-.163**	1											
Sig. (2-tailed)	.000	.001												
4 Pearson Correlation	.290**	-.204**	.341**	1										
Sig. (2-tailed)	.000	.000	.000											
5 Pearson Correlation	-.182**	-.314**	-.182**	.081	1									
Sig. (2-tailed)	.000	.000	.000	.106										

6	Pearson Correlation	-.129*	-.005	-.307**	.219**	.400**	1											
	Sig. (2-tailed)	.010	.928	.000	.000	.000												
7	Pearson Correlation	-.193**	-.073	-.202**	.423**	.403**	.763**	1										
	Sig. (2-tailed)	.000	.145	.000	.000	.000	.000											
8	Pearson Correlation	.223**	.006	.295**	.371**	-.249**	.003	.248**	1									
	Sig. (2-tailed)	.000	.900	.000	.000	.000	.952	.000										
9	Pearson Correlation	.687**	.025	.722**	.173**	-.425**	-.545**	-.527**	.127*	1								
	Sig. (2-tailed)	.000	.615	.000	.001	.000	.000	.000	.011									
10	Pearson Correlation	-.087	-.074	-.253**	.259**	.527**	.770**	.830**	.160**	-.555**	1							
	Sig. (2-tailed)	.081	.138	.000	.000	.000	.000	.000	.001	.000								
11	Pearson Correlation	.087	.024	.050	.272**	.315**	.664**	.702**	.232**	-.210**	.667**	1						
	Sig. (2-tailed)	.083	.640	.325	.000	.000	.000	.000	.000	.000	.000							
12	Pearson Correlation	-.196**	.036	-.336**	-.050	.671**	.534**	.486**	-.176**	-.509**	.619**	.482**	1					
	Sig. (2-tailed)	.000	.475	.000	.315	.000	.000	.000	.000	.000	.000	.000						
13	Pearson Correlation	.437**	-.190**	.518**	.228**	.198**	.293**	.195**	.101*	.274**	.228**	.427**	.166**	1				
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.044	.000	.000	.000	.001					
14	Pearson Correlation	.586**	-.191**	.666**	.383**	.212**	.146**	.129*	.110*	.440**	.184**	.281**	.064	.659**	1			
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.004	.010	.028	.000	.000	.000	.199	.000				

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed).

Note: 1-Electrical faults, 2-Sanitary appliance, 3-Pipes linkage, 4-Damaged ceiling, 5-Damaged internal door, 6-Floor tile failure, 7-Damaged floor sheet, 8-Damaged taps/stop valves, 9-Damaged door locks, 10-Blocked drain, 11-Wall tile failure, 12-Damaged painting, 13-Damaged door and windows frame, 14-Reason for maintenance

5. Conclusion

The study seeks to investigate the maintenance priority preference among public housing residents and their reasons for such ranking. It suggests that ‘work necessary to maintain the safety and health of residents’, ‘work necessary to keep property habitable’ and work necessary to keep buildings operable’ as the most important reasons for maintenance. It also shows that ‘electrical faults’, ‘sanitary appliance failure’ and ‘pipes linkage’ are the residents’ top three maintenance priority preferences. The results support Flores-Colen *et al.* (2010)’ findings on the importance of maintenance because of health, safety and functionality reasons.

The results imply that in order to improve the current situation of public housing management, the attention should be on ensuring the safety and good health of the residents. Specifically, maintenance work should focus on ensuring electrical, sanitary and pipes are in good condition. Suitable mechanisms for communication and response method should be planned to facilitate residents in detecting and reporting the above types of building failure. Improving the relationship between building managers and residents is one of the ways to ensure effective communication. Increasing residents’ awareness about the importance of building maintenance and active residents’ participation can help to minimize problems concerning the effectiveness of the response method. Further research on the maintenance prioritisation by various actors in housing maintenance is desirable because it is possible that different actors will have different perspectives on the criteria for maintenance and priority preferences. Such studies will complement the present findings on the decision criteria for the prioritization of maintenance actions.

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