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“Public Participation: Shaping a sustainable future”

Managing Facilities on Malaysian Low-cost Public Residential for Sustainable Adaptation

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Abstract

Public housing is affordable living houses for low-income group and to overcome the issues of illegal squatters in towns and cities area. Within limited space of land, a multi-storey low-cost building will enable to provide many housing units to be built. This research aims to highlight and analyze issues faced by the management of low-cost public housing toward the sustainable adaptation of existing facilities. Analysis is based from a comparative study of managing multi-storey housing and feedback given by the stakeholders. Finding identified will provides important data to enhance physical facilities requirement and extensive consideration relevant to sustainable adaptation, which the entire problems concurrently in multi-storey public housing can be well treated.

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1. Introduction

Public housing built by Malaysian Government is basically to provide affordable living houses for low-income group and overcome the issues of illegal squatters in towns and cities area. Within limited space of land, a multi-storey low-cost housing will enable to provide many dwelling units to be built.

Public housing is one of the important affordable homes for all citizens particularly on low income group. Various public housing schemes have been implemented by the government among them are

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Projek Perumahan Awam Kos Rendah (PAKR), Projek Perumahan Rakyat (PPR) Bersepadu (MITEN), Projek Perumahan Rakyat (PPR) Disewa Dasar Baru and Projek Perumahan Rakyat (PPR) Dimiliki Dasar Baru. Since there are so many completed and occupied public housing projects provided by government, the public housing management not exempt from problems in managing their assets and facilities. Many research studies have found over the years after post construction, most of these public housing building had deteriorated and in the state of despair, become progressively vandalized and badly to hold.

Continuous assessment on the facilities performance of low-cost public housing is essential in order to monitor up to date condition and guide future public housing management. A studied on residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia, Mohit M.A (2010), recommended that public agencies for low-cost housing should give attention on the management of support and public facilities to enhance residential satisfaction of the inhabitants. This research intends to investigate alternative adaptation opportunities and action strategies in managing facilities of low-cost public housing in Malaysia.

Previous research on public housing in Malaysia such as Husna and Nurijan (1987), Tan (1980), Sulong (1984), Oh (2000), Nurizan and Hashim (2001), Salleh (2008) tends to focus on the issues of residential satisfaction. Nurizan (1993) reported that the residents of low-cost housing in Johor Bahru were only satisfied with public transport and distance of housing from the city but not satisfied with the rental and the house size. Oh (2000) in her study on revealed that the residents were not satisfied with the size of the kitchen, plumbing services and public facilities such as recreational areas, playground, public transport services in the housing area. The existing literature on public housing in Malaysia focus on the factors which could affect residential satisfaction such as a defect in the physical structure of the housing, lack of well maintained public facilities and poor social and physical environment. However, the strategic on adapting public housing aspect in Malaysia has not been comprehensively discussed and debated.

2. Issues and problem statement

Report on affordable housing issues, Rinker (2008), pointed out that the badly deteriorated of a public housing projects are due to a combination of hasty construction, poor design and insufficient maintenance. The low cost housing has always been criticized for poor quality and defective outcomes (Abdellatif, 2006; Elias, 2003). Accommodation does not meet residents expectations and not designed to suit residents requirement are among frequent complaint by customers and end-users of low-income building projects (Abdellatif, 2006). Various defects of construction could be due to substandard construction strategies, faulty workmanship inside and outside the house, bad building materials, improper soil analysis and preparation or poor drainage systems (Auchterlounie, 2009).

Research on defects in affordable Housing Projects in Klang Valley, Malaysia, Hamzah (2012), found the most common defects occurring in affordable housing such as leaking pipes, failure of water supply system, cracking in external walls, dampness to concrete walls and faulty door knobs. Research on factors influencing the performance of low-cost public housing in Selangor, Malaysia, Hashim et. Al (2012), identified failure in waterproofing system claimed the highest frequency followed by leakages at jointing and piping system. The current maintenance managements practiced in Malaysia are mostly not give priority for maintenance works and remedial works properly resulted in over budget expenses (A. a. H. Zakaria, Saufi, 2007). Improper maintenance managements practice has caused the federal government facing various issues, which will burden the government and the public. Kuala Lumpur Structure plan 2020 reported that the maintenance procedures for public housing are reactive rather than preventively leading to wastage of resources and consequently higher maintenance costs. This problem is exacerbated as costs escalate when the building getting older. The use of cheap low quality building materials and poor workmanship has also been identified as the main problems resulted to high maintenance cost for

this type of houses. (A. Zakaria, Hamzah, Saufi, 2007), stated that results in over budget costing for maintenance and remedial works of current buildings in Malaysia are due to lack of systematic and not clearly emphasized the facilities maintenance management practice. Table 1 shows summaries of issues in managing public assets in Malaysia.

Table 1. Summary of issues in managing public assets in Malaysia

AUTHOR, YEARS	ISSUES	CAUSE
National Housing Department and DBKL, 2007	Management of assets and facilities, High rent arrears.	Vandalism, repairs.
Zakaria, 2007	Burden the government.	Current building and facilities maintenance not being emphasized clearly and systematically.
Hong, 2008	Management of assets and facilities, building defect, maintenance, abandoned project	Lack of expertise, inappropriate work culture, below par quality system.
Natasha Halil, 2008	Maintenance failures & Building defect constantly increased	The chronology defect of maintenance sector was being unstable reported
Chuan, 2008	The ministry of Housing & Local government received between 2,400-4,500 maintenance complaint each year over the last five years.	Wall cracks, roof leakages, plumbing problems, poor plasterer ground settlement
Kuala Lumpur Structure Plan 2010	Many abandoned units being left to rot, high maintenance cost.	Residents have very low income, revenues are far less than cost, operating units, high vandalism rate.
Hamzah, 2012	Common defect occurred in affordable housing.	Pipes leaking, failure of water supply, cracking in external walls, dampness to concrete walls and faulty door knobs
(Hashim, Samikon, Nasir, & Ismail, 2012)	Factors influenced performance of low-cost public housing.	Failure of waterproofing system, water leakage, rain penetration, cracking, staining, paint defect, spalling of concrete, water penetration through a crack and corrosion.

Pekeliling flats or formerly known as Tunku Abdul Rahman Flats were one of the earliest housing projects in Kuala Lumpur with 11 block built between 1964 and 1967. Due to no longer fit for affordable housing requirement, 2 blocks A & B were demolished in mid 2006. The Government has directed Kuala Lumpur City Hall (DBKL) to demolish the remaining of more than 45 years old blocks of the dilapidated and abandoned building, which was supposed to be demolished in early 2010, has been left rot due to a legal tussle and the authorities did not want to get involved. Decision to redevelop the Tunku Abdul Rahman Flats (Pekeliling Flats) into commercial centre has received mixed reactions from the Public (Community, 2013a). The Kampung Kerinchi low-cost flats were built by PKNS in the 1970s, were redeveloped in the year 2012 due to the poor condition of the flats had deteriorated. Amongst the

problems faced by the residents were piping and sewerage problems, burst pipes, not functioning lifts, and lack of cleanliness. The residents have been relocated to transit homes in PPR Kerinchi and PPR Seri Chempaka while waiting for the project to be completed (Community, 2013b). The fundamental of decision towards any of the redevelopment project in Malaysia is still need to be polished and need to be well structured. The deficiency of system practice in the managing the adaptation of public asset can cause delay of action to preserve public asset from decay.



Fig.1. (a) Pekeliling Flats, Kuala Lumpur; (b) Kampung Kerinchi low-cost flats

The selection method of building conservation is referring to assessment analysis and record data of building defects. This is important to decide relevant potential factors of building adaptation particularly to the existing public housing in Malaysia as an important stage in the process to sustain its role (Samikon, Ismail, Hashim, & Nasir, 2013). Compared to general construction, adapting existing buildings involves high levels of risks and uncertainty (Boyd D, 1992; CO., 1999; MG, 2000). Building adaptation also involves more unknowns in the construction stage than in general construction (Douglas, 2006).

3. Sustainable adaptation

Adaptation in the context of human dimensions of global change usually refers to a process, action or outcome in a system (household, community, group, sector, region, country) in order to cope with the better system, manage or adjust to some changing condition, stress, hazard, risk or opportunity (Barry, 2006). The long lifespan of the existing building stocks means the majority of it will still be in use between 50 – 100 years time. Therefore, it is crucial, to develop policies and strategies that encourage early adaptation of existing building (Camileri, 2001). According to Ashworth (1996), almost half of the output in the construction industry around the world is work associated with existing facilities. This is result of a switch from new facilities to adaptation and rehabilitation of existing properties.

Adaptation generally mean as a changing of its use, while retaining the original building condition to the most and prolonging its useful life (Ball, 2002; Bullen, 2007; Douglas., 2006; Mansfield, 2002). According to Douglas. (2006), building adaptation refers to any task of changing the capacity, function or performance of a building over and above maintenance, adjustment, reuse or upgrading a building to accommodate current condition. Teo (2011) found that to repair and to repaint the building facades are

the most common practice adaptation action in order to keep existing building with minimal maintenance. Samikon et al. (2013) have grouped 6 potential factors of building adaptation consist of physical, economic, legal, social and environmental, management and technology. Proper identification factors will help the management team of public housing to have standardized solution in more economic wise, avoiding waste and proper management techniques through the understanding of occurrences and the character of defects.

Generally terms like “renovation”, “refurbishment”, “remodeling”, “reinstatement”, “retrofitting”, “rehabilitation”, and “recycling” of buildings are incorporated in adaptation. Adaptation can occur “within use” and “across use”; for example, an office which undergo adaptation, either to remain as an office (within use adaptation) or it may change use to residential and be class as “across use” adaptation (Ellison, 2007). Assessment factors of probability building adaptive reuse depends on its building lifespan, age and housing obsolescence factors (Langston C, 2008). Wilkinson SJ (2009) formulated a group of physical, economic, environmental, social and legal variables in a building attribute database in assessing adaptation factors. Within the same context, this study endeavors to explore related appropriate adaptation action as the way to resolve issues on existing performance of public housing facilities in Malaysia.

In Singapore, in order to solve issues on public residential building built in the years 1970s and 1980s, a long term public housing renewal policy have been introduced by the Singapore government, embracing a set of heavily subsidised building adaptation programmes, such as Lift Upgrading Programme (LUP), Selective En-block Redevelopment Scheme (SERS), Home Improvement Programme (HIP) and Neighbourhood Renewal Programme (NRP). Nonetheless the extent of these various programme adaptation as per shown in table 4 is only implemented if at least 75% of the eligible HDB (Housing and Development Board) household need them (Low, 1996).

Table 2. Extent of the adaptation works. (Source: HDB, 2010; Hui CME, 2008; Joo TTK, 2001; SM, 2004)

PROGRAMME	SCOPE
LUP (Lift Upgrading Programme)	Direct lift access for every floor
SERS (Selective En-block Redevelopment Scheme)	Building new flats; demolishing old flats and rebuilding a new block on a separate site.
HIP (Home Improvement Programme)	Replacement of waste pipes, pipe sockets, entrance door, entrance grille gate and refuse hopper; repair of spoiling concrete and structural cracks; and upgrading of electrical supply and toilets.
NRP (Neighbourhood Renewal Programme)	Upgrading drop-off porch, covered link-ways, playground, footpaths, fitness corner, jogging track, barbeque pits, skating park, soccer hard court, tennis court, block security/ surveillance system, etc.

4. Methodology

Data are collected through case study, information sharing, peer and critical observation on site in four locations of public housing in Selangor, Malaysia. Analysis is based from a comparative study of managing multi- storey housing and feedback given by the stakeholders. The researcher has distributed questionnaires, conducted structure interviews and also did some critical observations on selected sites. The data were analyzed using Relative Index and Frequency Analysis to indicate the level of agreement or significance of each structured question. The data of management points of view and operational practices is collected from the questionnaires answer by appointed property manager, residents and non

residents of multi-storey low-cost public housing. In addition, the case studies also investigated the condition of building, and whether these buildings are properly maintained and promote good well being to its residents.

5. Finding and discussion

The aim of this research paper is to highlight and analyse issues faced by the management of multi-storey building public housing toward the sustainable adaptation of existing facilities. From the survey, all of the respondents stated that their representatives are knowledgeable and well trained in identifying the types of defects occurred. All of the respondents also agree that some of the complaint lodged by tenants are not purely physical defects but also including design deficiency. The most frequent ways that tenants of public housing complaint received via face to face, while the remaining stated that tenants make complaints via letter writing and phone calls. The respondents were agreed that the most common complaints lodge by tenants in low-cost public housing is with regards to the poor workmanship by contractors, which gives the Relative Index of 0.687. It is then followed by a defect in their units are not attended within the time specified, and defect in their unit are attended but not up to their satisfaction (0.5 Relative Index). Respondents disagree that common complaints lodge by tenants are poor customer service provided by property management and also did not agree with the statement that they do not see the importance of maintaining the building.

From the management experienced, issues and problems that are mostly faced by the property manager of public housing are an obstruction to common area that associated the house rules abuse by residents and vandalism cases (Figure 2). Results from the management experience, most of the respondents agreed that only some of the public housing tenants abide by the house rules while the majority of them disregard rules. Most of the management managed the vandalism cases by rectify only critical damage. Littering also is a serious problem in public housing. Surveys have shown that litterbugs have a common behavioural tendency. With this mentality, the littering problems are most serious in several secluded areas such as in the lift car, walkway at the back of the block and the letterbox areas.



Fig.2. (a) Vandalism (b) Indiscriminate littering

Figure 3 shows the first ranked of defect are waterproofing issues, water leakage through pipe fittings and joints due to quality of materials and design factors and also methods techniques of construction and maintenance. Figure 4 show generally residents were satisfied with the service provided except for the pipes repair and safety in their dwelling units, which needed improvement in their housing areas. From the non-resident point of view, most of them unsatisfied with space in the kitchen, space in the living room and air circulation at a dwelling unit. Finding identified will provides important data to enhance

physical management requirement and extensive consideration relevant to sustainable adaptation, which the entire problems concurrently in public housing facilities can be well treated. Efficient facilities management if effectively undertaken could solve the technical issue and reduce the maintenance cost.

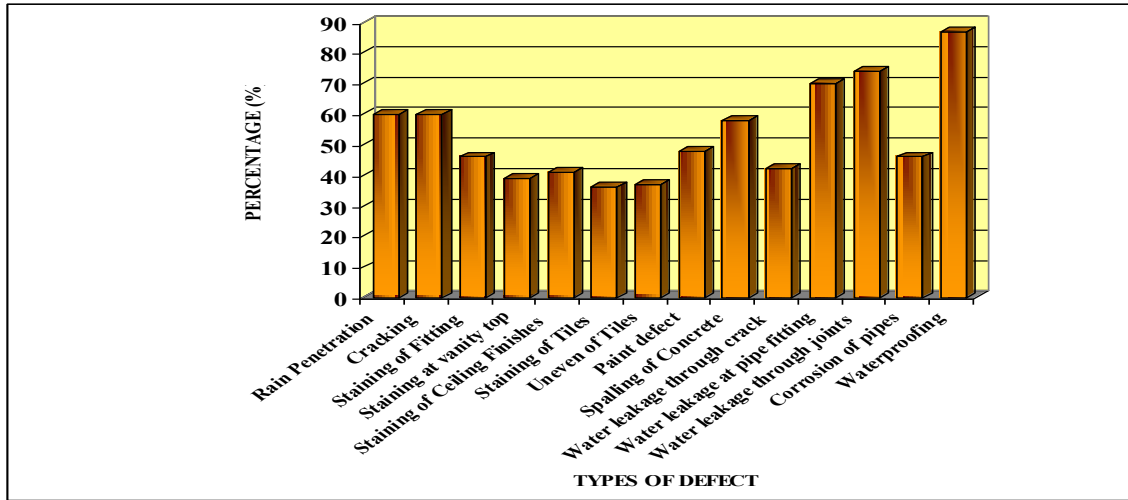


Fig.3. Frequency of defect identified

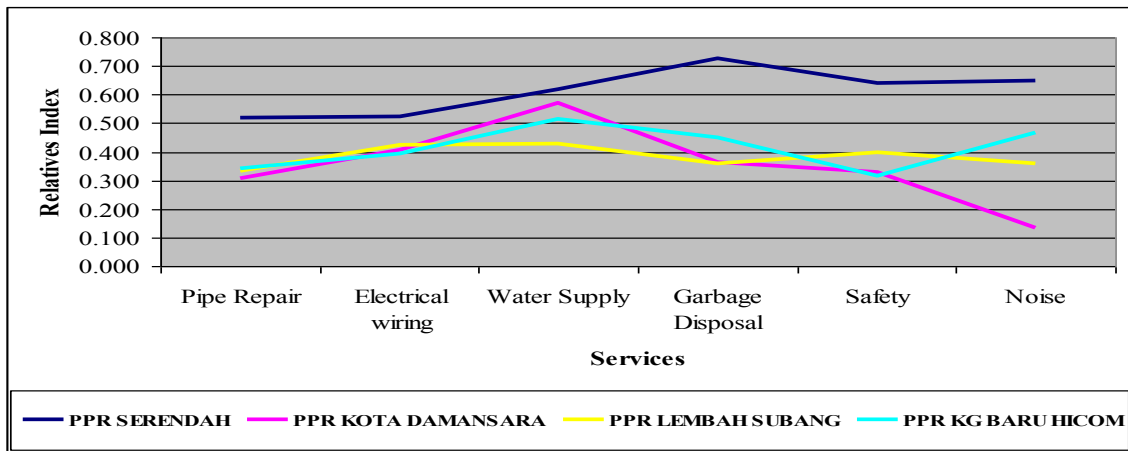


Fig.4. Level of satisfaction with services provided by public housing management

Ramly et al. (2006) suggested that design defects can be avoided by promoting good design team, research and using feedback and records from maintenance teams. The design team should give input based on the client’s needs. Maintenance records are important and should be provided to designers so that the same mistakes are not repeated. Outsourcing of professional housing services has become a common strategic choice involves empowerment. In order to benefit consumers, the production of professional services such as housing management and/or housing maintenance service is transferred to the external suppliers (Terence Y.M. Lam, 2007).

In order to achieve the aim of using building adaptation to deliver building sustainability (Wilkinson SJ, 2009), Douglas (2006) and Watson (2009) stressed that building sustainable performance should be considered. Rather than demolish and rebuild or rather than build new (Campbell, 1996); (Highfield,

2000); (Ball, 2002); (Douglas, 2006); (Shipley, 2006); (Bullen, 2007), demolition is seen as wasteful in terms of materials (Department of Environment and Heritage, 2005) and it is often less expensive to adapt a building.

Since public housing in Malaysia also were built since 1970, Malaysian government also not exempt to face issues related to retaining of existing more than 30 years old building and its facilities in order to prolong its useful life. Thus, there is a need to identify the important of having proper strategic procedure in handling existing public housing and its facilities through sustainable adaptations.

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References

- Abdellatif, M. A. a. O., A.A.E. (2006). Improving the sustainability of low-income housing projects: The case of residential buildings in Musaffah commercial city, Abu Dhabi. *Emirates Journal for Engineering Research*, 11(2), 47-58.
- Ashworth, A. (1996). Assessing the life expectancies of buildings and their components in life cycle costing. *COBRA 96*(available . Retrieved from www.rics-foundation.org/index.html
- Auchterlounie, T. (2009). Recurring quality issue in the UK private house building industry. *Structural Survey*, 27(3), 241-251.
- Ball, R. M. (2002). Re-use potential and vacant industrial premises: revisiting the regeneration issue in Stoke on Trent. *Journal of Property Research*, 19, 93-110.
- Boyd D, J. L. (1992). The limits of intelligent office refurbishment. *Property Management*, 11,102-111.
- Bullen, P. A. (2007). Adaptive reuse and sustainability of commercial buildings. *Facilities*, 25, 20-31.
- Camileri, M., Jaques, R., & Isaacs, N. (2001). Impacts of climate change on building performance in New Zealand. *Building research and information*, 27(6), 440-450.
- Campbell, J. (1996). Is your building a candidate for adaptive reuse?. *Journal of Property Management*, 61(1), 26-30.
- CO., E. (1999). Skills, knowledge and competencies for managing construction refurbishment works. *Construction Management and Economics* 1999, 17, 29e43.
- Community, T. S. O. (2013a). Discussion heats up on Pekeliling. Retrieved from <http://www.thestar.com.my/News/Community/2013/07/15/Discussion-heats-up-on-Pekeliling-Proposed-redevelopment-of-the-landmark-flats-receives-mixed-reacti.aspx>.
- Community, T. S. O. (2013b). Owners draw lots for new flats in Kerinchi Residency. Retrieved from <http://www.thestar.com.my/News/Community/2013/07/13/Owners-draw-lots-for-new-flats-in-Kerinchi-Residency.aspx>.
- Douglas, J. (2006). In: Building adaptation (2nd ed). Oxford: Butterworth Heinemann. 1-47.
- Douglas., J. (2006). In: Building adaptation (2nd ed)(Oxford: Butterworth Heinemann). 3.
- Elias, I. (2003). Achieving quality in housing construction through standardisation. *2nd Asian Forum Conference Tokyo*, pp 1-3.
- Ellison, L. a. S., S. (2007). Assessing sustainability in the existing commercial property stock. *Property Management*, 25(3), 287-304.
- Hamzah, C. W., Wood, L. C., & Khoo, Y. M. (2012). Defects in affordable housing projects in KLang Valley, Malaysia. *Journal of Performance of Constructed Facilities*,10. Retrieved from 1061/(ASCE)CF.1943-5509.0000413.
- Hashim, A. E., Samikon, S. A., Nasir, N. M., & Ismail, N. (2012). Assessing factors influencing performance of Malaysian low-cost public housing in sustainable environment. *Procedia-Social and Behavioral Sciences*, 50, 920-927.
- HDB. (2010). What is the home improvement programme (HIP), Singapore: The housing and development board of Singapore .
- Highfield, D. (2000). *Refurbishment and upgrading of buildings*. London: E & FN Spon.
- Hui, C. M. E., W. T., Wan, K. M. J. (2008). A review of the effectiveness of urban renewal in Hong Kong. *Property Management*, 26, 25-42.
- Joo, T. T. K., W. T. (2001). Public housing in Singapore: A sustainable housing form and development. In: Wong, et al., editors. *Spatial Planning for a Sustainable Singapore*. Singapore: Springer Science Business Media B.V, 135-150.
- Langston, C. W. K., Hui, C. M. E. , Shen, L. Y. (2008). Strategic assessment of building adaptive reuse opportunities in Hong Kong. *Building and Environment*, 43, 1709-18.

- Low, S. (1996). The management of large-scale upgrading programmes for public housing in Singapore. *Property Management* 14, 27e32.
- Mansfield, J. R. (2002). What's in a name? Complexities in the definition of "refurbishment". *Property Management*, 20(1), 23-30.
- MG, H. (2000). Service management in housing refurbishment: a theoretical approach. *Construction Management and Economics*, 18, 525e33.
- Mohit, M. A. M. I., & Yong Razidah, R. (2010). Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat International*, 34, 18-27.
- Nurizan, Y. (1993). Space deficit in low-cost household of Peninsular Malaysia. *Kajian Malaysia*, 11(1), 56-75.
- Oh, L. S. (2000). *Housing satisfaction of middle income households in Bandar Baru Bangi, Selangor*. Dissertation, Universiti Pertanian Malaysia.
- Rinker, M. E. (2008). Affordable housing issues. *Shimberg Center for Affordable Housing*, XIX(5), 1-4.
- Samikon, S., Ismail, Z., Hashim, A., & Nasir, N. (2013). Managing adaptation in low-cost public housing: A conceptual framework. *Energy, Environmental and Structural Engineering Series*, 9.
- Shiple, R., Utz, S., & Parsons, M. (2006). Does adaptive reuse pay? A study of the business of building renovation in Ontario Canada. *International Journal of Heritage Studies*, 12(6), 505-520.
- SM, Y. (2004). Impact of public housing upgrading on residents. In : *APNHR conference: housing and social development: emerging theoretical issues in Asia Pacific, Hong Kong*.
- Teo. (2011). Determination of strategic adaptation actions for public housing in Singapore. *Building and Environment*.
- Watson, P. (2009). The key issues when choosing adaptation of an existing building over new build. *Journal of Building Appraisal*, 4, 215-23.
- Wilkinson, S. J. J. K., & Reed, R. (2009). Using building adaptation to deliver sustainability in Australia. *Structural Survey*, 2, 46-61.
- Zakaria, A., & Hamzah, S. (Agust 15, 2007). Pelan kualiti elak projek hadapi masalah: Majlis aset kebangsaan mampu tingkatkan kecekapan penyenggaraan. *Berita Harian*, 2.