

INTERNATIONAL COOPERATION IN URBAN RESIDENTIAL UPGRADING IN JAKARTA¹

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Summary: *This paper presents an application of the analytic hierarchy process (AHP) in building consensus among experts on the choice of urban residential upgrading schemes and to assess the acceptability of such schemes in Jakarta. Questionnaires were administered on both international and Indonesia experts involved in residential upgrading in Jakarta. Questionnaires also were distributed to selected sample households living in the case study areas. Given the goal of urban residential improvement, they were asked to weigh such alternatives as multi-storey housing (MS), single-detached housing (SD), and Kampung Improvement Programme (KIP) based on such criteria as tenure, floor area, accessibility to work place, accessibility to transportation and lifestyle. It was found that accessibility to work place was the most important criterion while multi-storey housing was the single most preferred housing. The households' opinion revealed that multi-storey housing was the most preferred alternative housing and they were largely satisfied with their housing conditions.*

I. Introduction

International cooperation takes on added significance and importance in the light of recent trends in the globalization and interdependency of the world economy. In this context, cooperation among countries and among all actors within countries is essential to the achievement of the provision of housing for all. The formulation and implementation of strategies for housing development is the primary responsibility of each country at the national and local levels, within the legal framework of each country.

The international financial institutions and aid agencies, including multilateral and bilateral aid agencies, and the private sector have an important role to play in providing additional resources to reinforce national efforts to foster the objective of adequate shelter for all and sustainable development of human settlements (UNCHS, 1996).

2. Research Background

Jakarta, the capital and largest city of Indonesia is located in the northwest of Java Island, and its northern part faces Java Sea. It has a land area of 664 square kilometers. The total population is 8.361 millions and the average annual population growth rate is 0.17 per cent during 1990-2000 with a

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density of 12.635 thousands population for each square kilometer (Indonesia has a land area of about 1.9 millions square kilometers with a total population of 206.3 millions in mid 2000. The rate of population growth was 1.49 per cent during 1990-2000). The total number of households in the city is 2.232 millions, with an average household size of 3.8 during 1990 – 2000 (Central Bureau Statistics, 2001). Urbanization in Jakarta is primarily a function of population that has been growing with over half of the population growth due to net immigration from other parts of Indonesia. These population influxes have led to the development of low-income marginal settlements popularly referred to as *kampongs*.

International financial institutions such as the World Bank (WB), the Asian Development Bank (WB) and aid agencies such as the Japan Bank for International Cooperation (JBIC) and Japan International Cooperation Agency (JICA) in cooperation with the Government of Indonesia (GOI) have been implementing urban residential upgrading schemes in Jakarta as well as in other cities in response to this problems. The focus of this assistance is the provision of both financial and technical assistance to programmes aimed at improving the urban environment. Among such programmes are the construction of multi-storey housing, site and services with single-detached housing, and the *Kampung* Improvement Programme (KIP).

Given the goal of urban residential upgrading in Jakarta, a subject that has attracted the attention of researchers in recent years (Ishizaka et al., 1997, and Shibata et al. 1995), this paper examines the most viable alternatives among multi-storey housing, single-detached housing, and KIP reviewed in these studies. A multi-criteria decision-making process is employed using the Analytic Hierarchy Process (AHP) developed by Saaty (1989, 1996) and applied by such authors as Yin et al. (1999) and Homma et al. (1998).

This research examines the place of international cooperation in urban residential upgrading in Jakarta in order to make such efforts more effective in the future. The specific objectives of this research are: (1) to examine the most important criteria in this decision-making process and search for both consensus and variation in judgments in both groups of international and Indonesian experts involved in urban residential upgrading schemes in the case study areas; (2) to perform a sensitivity analysis to determine how changes in variable criteria affect the findings of the study; and (3) to assess the level of residential satisfaction of housing in case study areas in order to examine acceptability of experts' opinion.

Here we examine notable urban residential upgrading schemes embarked upon by various international financial institutions and aid agencies in cooperation with the Indonesia Government in urban residential upgrading in Jakarta.

2.1 The *Kampung* Improvement Program (KIP)

One well-known example of such international cooperation is the *Kampung* Improvement Programme. The indigenous residential areas known as *kampongs* are an important part of the landscape of Indonesian cities. The oldest *kampongs* originated as “urban” villages during the colonial period when residential separation between the Indonesian and non-Indonesian residents (including Chinese populations and Dutch settlers) was the dominant feature of urban agglomerations in the country. The term refers to predominantly residential areas, which were often rural villages that have been engulfed by the rapid urban expansion and incorporated within the city. These “urban villages” which include middle-income as well as low-income families, are characterized by generally inadequate physical infrastructure and social services. They are usually over-crowded neighborhoods, often on land occupied without authorized tenure, and without minimum urban infrastructure such as drainage, piped water, and accessible road network. Its residents are often new migrants from the rural areas engaged in the informal sector of the economy.

In 1969 the Government recognized these *kampongs* as permanent settlements and inaugurated a programme to improve the physical infrastructures. It was an attempt to meet minimum infrastructure needs of large numbers of urban poor at low cost. Since the government was unable to provide all the resources necessary to rebuild the *kampongs*, it then decided to concentrate its available resources on

improvement of those physical infrastructures, which the people found most difficult or impossible to organize and construct themselves. Gradual improvement of the existing settlements through the provision of basic structures and services necessary to create a pleasant and healthy urban environment was then adopted as a strategy (ADB, 1999). It involved the provision of access roads, paved footpaths, drainage, piped water, sanitation facilities and public services (such as primary schools and clinics), while keeping the current residents on the same site as much as possible. KIP, however, did not involve improvement in individual residential structure. This was not only to minimize the project cost, but also to encourage private self-help initiatives and avoid getting involved in the sensitive issue of land tenure.

The first KIP project was started in 1969, the first year of the Five-Year Development Plan of the Republic of Indonesia (PELITA I), by an initiative of the City of Jakarta. By 1973, KIP projects upgraded areas over 2,400 hectares, thereby providing various benefits to over 1.2 million residents. The World Bank was impressed by the cost-effectiveness of KIP and from 1971 extended loans for the implementation of more KIP projects in Jakarta and elsewhere in Indonesia (WB, 1993).

By the end of the seventies, however, the limitation of the concept of KIP began to manifest. It became increasingly difficult to find project sites where land could be spared for common public services such as roads and footpaths in the over-crowded neighborhoods. Also, in spite of the efforts to encourage current residents to stay in the neighborhood, there has been an influx of relatively higher income groups (gentrification) into the *kampongs* as the quality of its environment improved. Due to the low-cost construction work, some early project sites started to show deterioration that required costly repair.

2.2 Single-Detached Housing (SD)

The National Urban Development Corporation (*PERUMNAS*) was established in 1974 as a new government agency to manage low-cost housing development. *PERUMNAS* was expected to behave like a private enterprise, while also supplying socialized housing to the people. It had to use government standards, so that the houses could be considered adequate in terms of space allocation for neighborhood services among others. The establishment of *PERUMNAS* boosted the supply of single-detached low cost housing. Single-detached housing in this paper also includes duplex and row houses.

A low cost housing is defined as a single-storey housing with a maximum floor size of 70 square meters, and a plot size of 54 square meters to 200 square meters. Low cost housing consists of large, small, and very low cost type, as well as ready to develop land. The large type low cost housing has a floor size ranging from 36 square meters to 70 square meters, while the small type ranges between 21 and 36 square meters. The very low cost type has a floor area of between 21 and 36 square meters but with unit construction cost about half of the large type. It has at least a bathroom, a toilet and a multi-function room. Although this type of housing is popular as it allows access to the ground in a way that many Indonesians are accustomed to, it is often located in areas far away from the work place of the residents, in the periphery of the city in order to avoid high land price.

Other housing types are the medium and large housing types. Medium housing is a single-storey housing having a plot size of between 54 and 600 square meters while the large housing type is between 54 and 2,000 square meters. This classification is based on the guidelines of the government (Decree No. 04/KPTS/BKP4N/1995). In order to promote balanced development it required formal developers to construct units in a ratio of six low cost units and three medium size houses for every large house.

2.3 Multi-Storey Housing (MS)

The third program is the multi-storey or flat housing which has drawn the attention of many authors (Yokobori et. al., 1998 Morishige et al., 1994 Morishige et al., 1993 and Nagasawa et al., 1993). Multi-storey housing has been implemented in Indonesia since 1980 in order to fill the shortage of housing stock for the low and middle-income people, particularly in the big cities.

The decision to build multi-storey housing was based on increasing the efficiency of urban land use, in

the course of urban renewal program in the big cities. Another consideration was the poor living conditions of people in the *kampongs* with extreme over-crowding. Based on these considerations, the government has made efforts to improve and renew their living environment and offer people the chance to live in such houses. It was started in 1980 when *PERUMNAS* constructed the first walk-up flats for low-income people in *Kebon Kacang* in central Jakarta. The development of multi-storey residential buildings has since become common in many Indonesian cities (JICA, 1998). However, many Indonesians believe that their traditional family lifestyle cannot be sustained in multi-storey housing. This belief appears strong among recent migrants from the countryside to the cities.

3. The Analytic Hierarchy Process (AHP)

In this section, we employ the analytic hierarchy process developed by Saaty to determine the best alternatives among the three housing types, given the goal of urban residential improvement. The formal model can be stated as follows: Suppose A_1, A_2, \dots, A_n be the set of elements and w_1, w_2, \dots, w_n be the importance of each element with respect to some attribute. Pairwise comparison score between elements A_i and A_j , a_{ij}^* can be defined as $a_{ij}^* \equiv w_i/w_j$, or in the matrix form as shown below.

$$\mathbf{A}^* = (a_{ij}^*) \equiv \begin{pmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \cdots & w_2/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{pmatrix} \quad (1)$$

By multiplication of matrix \mathbf{A}^* on the right hand side by the vector, $\mathbf{w}=(w_1, w_2, \dots, w_n)^T$ becomes $n\mathbf{w}$. The resulting equation is given below:

$$(\mathbf{A}^* - n\mathbf{I})\mathbf{w} = 0 \quad (2)$$

Note that equation (2) is the characteristic equation of matrix \mathbf{A}^* and n is the maximum eigen value.

The importance w_i is supposed to be unobservable but pairwise comparisons of elements are possible with minimum errors. In other words, we have to estimate weight vector \mathbf{w} from observed pairwise comparison matrix \mathbf{A} . Because observed matrix \mathbf{A} contains inconsistency, equation (2) should be rewritten in a more relaxed form as:

$$(\mathbf{A} - \mathbf{I}_{\max})\mathbf{w} = 0 \quad (2')$$

Where \mathbf{I}_{\max} is a maximum eigen value. The weight vector \mathbf{w} is estimated as an eigen vector with respect to the maximum eigen value. The inconsistency ratio (CR) is defined as:

$$\text{CR} = \text{CI}/\text{RI} \text{ where } \text{CI} = \frac{\mathbf{I}_{\max} - n}{n - 1} \quad (3)$$

RI, Random Index, is defined in Saaty (1980).

3.1 Application to Urban Residential Upgrading

A hierarchical structure of our problem (urban residential upgrading in Jakarta), is constructed as follows:

- Level 1. goal
- Level 2. actors
- Level 3. criteria
- Level 4. alternatives in the study area

The overall objective (level 1) is residential upgrading as shown in Figure 1, with level 2 consisting of the actors, divided into international aid agencies (INT) and Indonesian officials (IND). There exists

pairwise comparison (A1) to evaluate the importance of international aid agencies relative to that of the Indonesian Government in urban residential upgrading in Jakarta. We identified five criteria (level 3) distilled from literature on residential upgrading (Mukoko, 1997). They are tenure (TEN), floor area (FLA), accessibility to work place (ACW), accessibility to transportation (ACT), and lifestyle (LFS). Here, tenure refers to the ownership of a property associated with a parcel of residential land or housing while floor area is the total area of rooms in a dwelling used for living, sleeping, eating, etc. Accessibility to work place is the distance from home to the place of work and accessibility to transportation is defined as access to the primary network of roads. Lifestyle refers to traditional housing taste of the people.

Pairwise comparison (B1) indicates the priorities of the criteria with respect to international aid agencies and B2 to that of the Government of Indonesia. Three residential upgrading alternatives (level 4) were identified in the study area. They are multi-storey (MS), single-detached housing (SD) and KIP. C11 in figure 1 shows the priorities of the alternatives by the international experts with respect to tenure. C12 through C15 are the priorities for the alternatives with respect to floor area, accessibility to work place, accessibility to transportation, and lifestyle. C21 through C25 are the equivalent Indonesian priorities.

3.2 Survey Design

Questionnaires were administered on a total of 30 experts made up of 14 international and 16 Indonesian experts involved in urban residential upgrading schemes in the study area. These experts come from diverse international and national institutions such as the World Bank, the Asian Development Bank, Japan International Cooperation Agency, Government officials, non-profit organizations etc. (Batubara, M, 2002).

Each expert made pairwise comparisons among the criteria in relation to the goal and among the alternatives in relation to the criteria. These evaluations were done on a scale of 1 to 9 based on the level of importance. 1 indicates equal importance, 3 moderate, 5 strong, 7 very strong and 9 extreme while other values lie in-between. The geometric means of all the respondents with respect to each question were then computed and are presented in the appendixes in matrix form. Matrix A1 (Appendix 1) represents the combined score of the responses of the 30 experts. While B1 (Appendix 2), C11 through C15 are the combined score of the 14 International experts, matrices B2 (Appendix 3), C21 through C25 are the scores for the 16 Indonesian experts.

We ran our model using Expert Choice for Windows (Expert Choice Inc., 1995). The results of our analysis are presented in the following section of this paper.

The household data were obtained from selected sample who are living in selected case study areas. The questionnaires were distributed to selected sample of 408 households. There were a total of 403 valid respondents who answered the questionnaire, and are mostly households heads living in case study areas such as *Kebon Kacang* multi-storey housing complex (70 households), *Klender* multi-storey housing

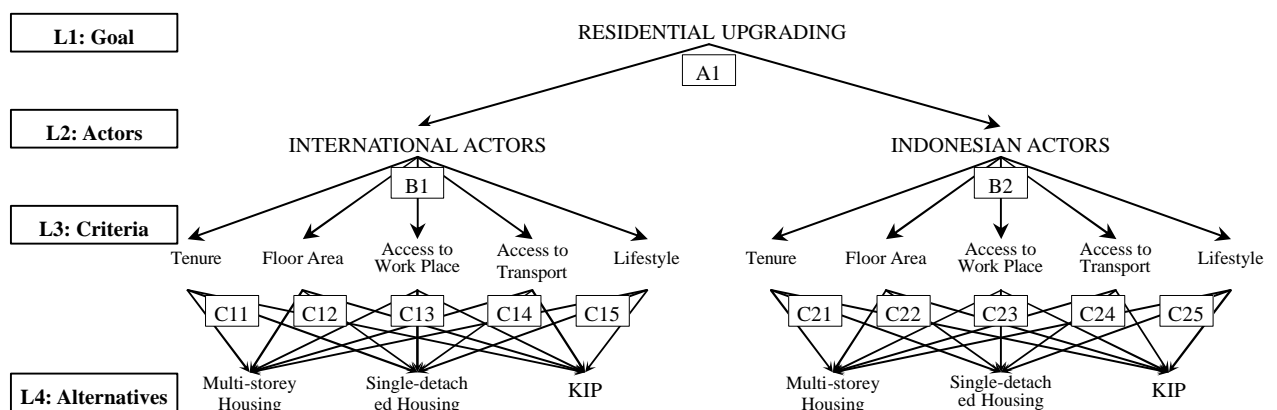


Figure 1. Hierarchy of the Model

complex (62 households), *Kemayoran* multi-storey housing complex (102 households), *Pasar Jumat* multi-storey housing complex (41 households), *Malaka Sari* single-detached housing complex (61 households), and *Cikini* on-site improvement or KIP complex (67 households). Secondary data were collected from the various reports and statistical national reports of the Indonesian government and international aid agencies.

With regard to level of residential satisfaction, each household in the case study areas asked to state its level satisfaction with its dwelling unit. Responses were scored on four points scale ranging from 1 for absolutely satisfied, 2 for partially satisfied, 3 for mediocre, and 4 for dissatisfied.

4. Results

The results of the pairwise comparisons by the experts and estimated weightings by criteria are shown in the appendixes. All the inconsistency ratios of our analysis were less than the acceptable level of 0.14 (Saaty, 1989).

The importance of international assistance to residential upgrading in Jakarta compared to the efforts of the Indonesian Government were weighted 0.583 and 0.417 respectively (appendix 1), indicating that international assistance to urban residential upgrading in Jakarta is slightly more favorably weighted. The priority scores are normalized to make the sum equal to unity.

Among the three alternatives in urban residential upgrading in our study area, there is a consensus of opinion by the two groups of experts that multi-storey housing is the most viable scheme. Figure 2 shows the relationship between the criteria and the alternatives from the point of view of the two groups. The international experts with respect to tenure, floor area, accessibility to transport and lifestyle evaluate the multi-storey higher than the Indonesian group. The Indonesian experts with respect to most criteria prefer the single-detached housing while KIP is the choice of the international group with respect to all of the criteria.

The priorities of the criteria with respect to our goal are as follows: tenure (0.159) floor area (0.077) accessibility to work place (0.451) accessibility to transportation (0.253) and lifestyle (0.061) as shows in figure 3. Accessibility to work place followed by accessibility to transportation are the two most weighted criteria among the five. This result indicates that transportation is vital in the life of many urbanizing cities as typified in this case by Jakarta city.

Given the three alternatives in urban residential upgrading in our study area, multi-storey housing is the most favored by all the experts (0.447) followed by single-detached housing (0.386) and KIP (0.166) (Figure 4). This is expected, as multi-storey housing is closely associated with the criterion of accessibility to work place.

In searching for variations and consensus in the views expressed by the two groups of experts, we found some slight variations and major areas of agreement by the experts. The priorities of the criteria with respect to the goal from the point of view of the international experts are tenure (0.155), floor area (0.082), accessibility to work place (0.446), accessibility to transportation (0.257), and lifestyle (0.060). For the Indonesian experts the weights are tenure (0.165), floor area (0.069), accessibility to work place (0.457), accessibility to transportation (0.247), and lifestyle (0.062). While accessibility to work place and accessibility to transportation still remain the main criteria by both groups of experts, lifestyle was weighted rather evenly (0.060 and 0.062) contrary to our expectation.

Finally, we performed sensitivity analyses to investigate the sensitivity of the alternatives to changes in the priorities of the criteria (Figures 5-9). There could be changes in the order of the alternatives as the priorities of some criteria are altered. While an increase in the priorities of tenure, floor area, accessibility to transport, and lifestyle in figures 5, 6, 8 and 9 makes single-detached housing the most attractive alternative, only a decline in accessibility to work place in figure 7 produces the same result. However, with an increase in importance of accessibility to work place, KIP then becomes the second most favored

alternative after multi-storey housing.

By applying the sensitive analysis we are able to visualize policy options as the priorities of the criteria change.

4.2 Examination of the Three Typologies of Urban Residential Upgrading

We employed the pairwise comparisons to determine the best alternatives among the three of housing types earlier reviewed i.e. multi-storey housing, single-detached housing, and KIP by households' opinion.

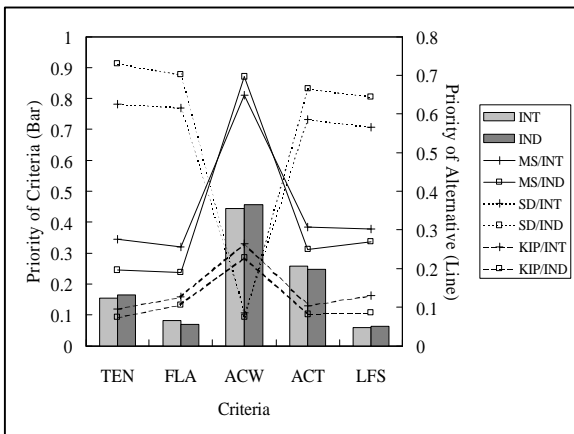


Fig.2. Comparison of both groups of experts

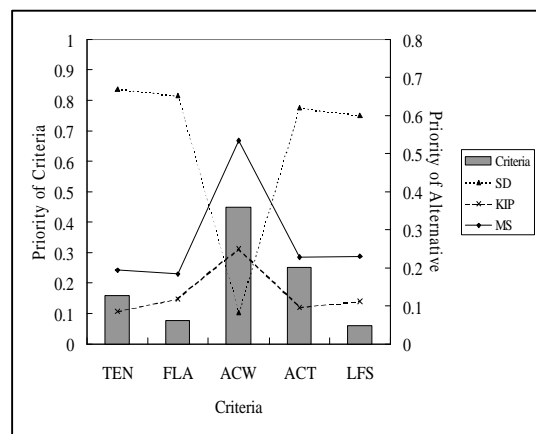


Fig.3. Priority of criteria and alternatives

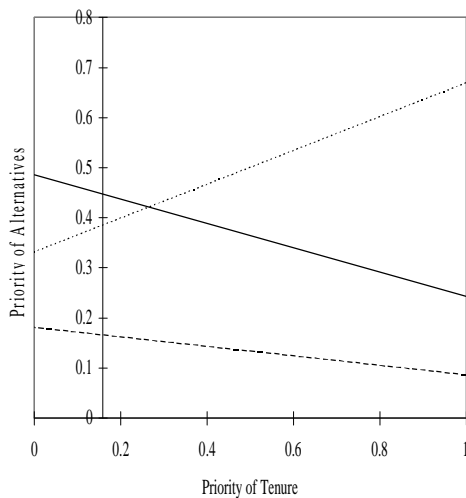


Fig.5. Sensitivity of tenure

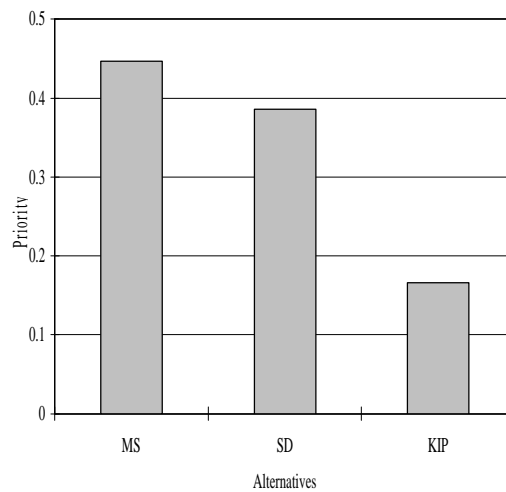


Fig.4. Priority of alternatives

Given the three alternatives in urban residential upgrading, multi-storey housing (0.62) is the most favored by the households followed by single-detached housing (0.27), and KIP (0.11) as we can see in Figure 10 below. This result shown there is a convergence opinion between experts' opinion and households' opinion in their evaluation of alternative.

The households' opinion with respect to multi-storey housing type (0.62) evaluates the multi-storey housing more weighted than experts' opinions (0.447). This result indicates, there is a demand on multi-storey housing in Jakarta. Therefore, the developments of multi-storey housing become an alternative for housing provision as an effort to maximize utilization of land, where the land stock

becomes limited and the price increase rapidly.

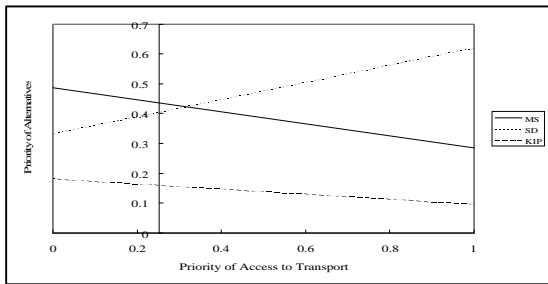


Fig.7. Sensitivity of transport

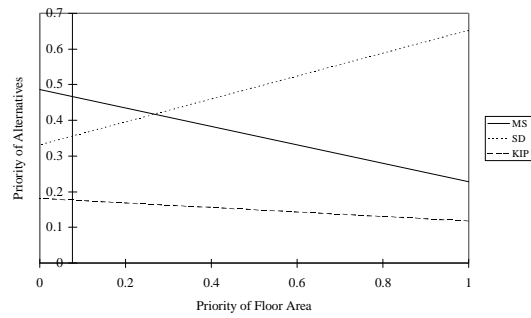


Fig.6. Sensitivity of floor area

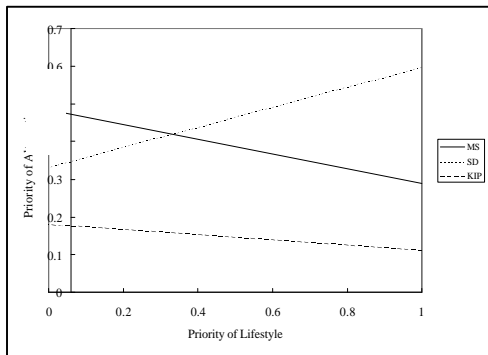


Fig.9. Sensitivity of lifestyle

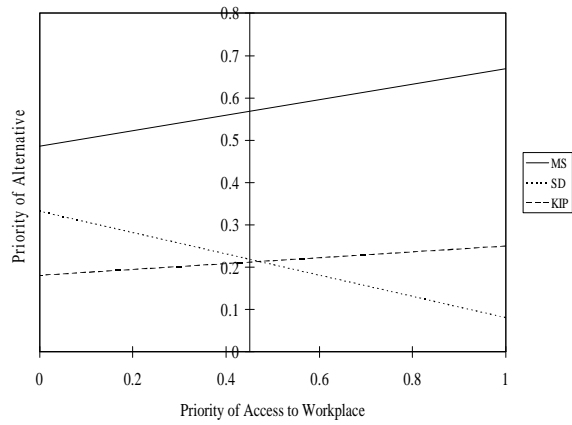


Fig.8. Sensitivity of workplace

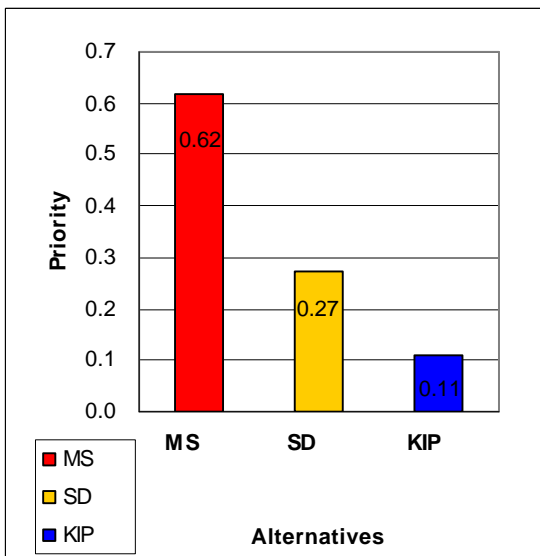


Fig. 10. Priorities of alternatives

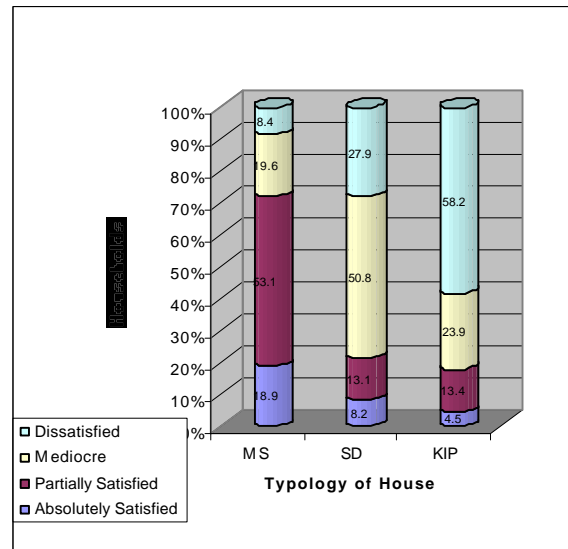


Fig.11. Level of residential satisfaction

With regard to the level of satisfaction, majority of residents living in multi-storey housing type were 'partially satisfied' with their current housing conditions (Figure 11 and Appendix 4). Majority residents living in single-detached housing type were stated 'mediocre', and majority of residents in the on-site improvement or KIP were stated 'dissatisfied' to their current housing conditions. The result presented on level of satisfaction make it very clear that the residents of multi-storey housing were largely satisfied to their housing conditions.

5. Conclusion

This paper presents a novel approach to evaluating alternative urban residential housing schemes in an attempt to upgrade the deplorable housing situation in many parts of Jakarta city. We found the methodology employed (Analytic Hierarchy Process) quite appropriate in building consensus among those involved in the conception and implementation of such schemes. It was found that accessibility to work place and multi-storey housing were the most dominant criterion and alternative respectively in the search for appropriate urban residential upgrading schemes in metropolitan Jakarta.

Cooperation between Indonesia and international aid agencies in urban residential upgrading in Jakarta concern on know-how rather than loan assistance. International assistance of the JBIC, JICA, WB, and ADB to urban residential upgrading in Jakarta was given higher importance than the Indonesian contribution. There is a convergence of opinions between the Indonesian experts and international experts in their evaluation of criteria and alternatives

The priorities of alternatives with respect to the urban residential upgrading program show that multi-storey housing is the most preferred housing type among the three typologies in the opinion of residents.

The examination of the three typologies of urban residential upgrading indicated that majority of residents living in multi-storey housing were largely satisfied.

Since accessibility to work place and accessibility to transportation are the most important in the opinion of experts and in the opinion of residents, strategic locations for the development of multi-storey housing near the work place and/or supported by good transportation should be encouraged in order to motivate people to live in multi-storey housing.

Multi-storey housing type may be good in one location but not in other locations. Our methodology was not specific to particular locations. Therefore, future research should analyze each one of the three typologies with respect to specific locations. This would ensure a comprehensive understanding of residential upgrading schemes in Indonesia in particular and the developing world in general.

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Appendix 1: Pairwise comparison by both of group of expert Appendix 4: Pairwise comparison by household

A1: Comparison of actors in terms of goal

	INT	IND	Priority
INT	1	1.4	0.583
IND	1/1.4	1	0.417

CR = 0.0

C1: Comparison of alternatives of goal CR = 0.01

C1	MS	SD	KIP	Priority
MS	1	2.4	5.1	0.618
SD	1/2.4	1	2.6	0.271
KIP	1/5.1	1/2.6	1	0.110

Appendix 3: Pairwise comparisons by Indonesian

B1: Comparison of criteria in terms of goal CR = 0.08

	TEN	FLA	ACW	ACT	LFS	Priority
TEN	1	3.5	1/4.8	1/3.0	3.5	0.155
FLA	1/3.5	1	1/4.4	1/3.2	2.2	0.082
ACW	4.8	1/4.4	1	2.3	4.2	0.446
ACT	3.0	3.2	1/2.3	1	3.4	0.257
LFS	1/3.5	1/2.2	1/4.2	1/3.4	1	0.060

Appendix 2: Pairwise comparisons by International

B2: Comparison of criteria in terms of goal

CR = 0.08

	TEN	FLA	ACW	ACT	LFS	Priority
TEN	1	4.6	1/4.5	1/2.8	3.9	0.165
FLA	1/4.6	1	1/6.7	1/4.1	2.4	0.069
ACW	4.5	6.7	1	2.7	3.3	0.457
ACT	2.8	4.1	1/2.7	1	3.4	0.247
LFS	1/3.9	1/2.4	1/3.3	1/3.4	1	0.062

