

# VISUALIZING URBAN RESETTLEMENT PROJECT IN THE CONTEXT OF COMMUNITY-BASED DEVELOPMENT

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**Abstract.** This research was focused on visualizing new housing model and its customization based on people's option as part of implementing community-based development principle. There are two significant research findings that are discussed in this paper that will be basis for developing a user-friendlier digital model as part of long-term research in visualizing whole resettlement process. The role of local person who is authorized to handle the model and to customize it to other inhabitants in the resettlement area is very essential in order to achieve the maximum versatility of the model. Another significant finding is potential of VRML model as information nodes for other digital modeling alternatives in an integrated information system for urban revitalization project.

## 1. Introduction

Vertical or flat housing as the main housing alternative for urban resettlement program in Indonesia still faces problems in its implementation. On the other hand the alternative seems to be the only feasible solution considering most of potential high-density population urban areas to be revitalized locate on strategic sites in urban downtown. Through cross-subsidy mechanism the resettlement has been implemented by allocating part of the site for commercial function and the remaining is consolidated for resettlement of local people. With smaller site allocated for inhabitants, vertical housing is an unavoidable alternative. Yet the implementation is not usually that easy. Community-based development (CBD) strategy as a more populist and democratic approach is still difficult to be implemented. This ideal concept could not be communicated to local people comprehensively. Communication tool in CBD approach for socializing the program couldn't

accommodate whole ideas. Hence local people still remain in their old perception about resettlement, where people usually had lost rather than having benefit from the project. Visualization has important role in this area. The complicated mechanism should be simplified into visual representation that is familiar to local people and enables to display multiple data sets (Pietsch, 2000; Dave and Bishop, 2000).

This ongoing research is set up based on this reality. The general objective is to create digital model that can visualize the project comprehensively so that local people can be stimulated and be familiar with proposed flat housing model. For the first stage, which is discussed in this paper, the objective is to create a prototype of preliminary digital model to be examined by participants who have been familiar with CBD program and other concerned people. This is to be done as basis to develop a more-ready-to use visualization model for socialization on local people, a prototype that can lead to be a decision support tools.

## **2. Precedents**

Complexity as main characteristic of urban problems has become main force to include computation in urban development and revitalization program. Ironically IT implementation in urban context in a third world country has faced local facts on limited IT resources. These issues shouldn't be taken into account if it concerns on financial matters as well as on lack of hardware and software resources. There should be local potential resources to compensate most of limitation on those aspects (Beamish, 1999). Emerging role of Internet has also led to wider Information Technology (IT) involvement in managing urban spatial development (Shiffer, 1995) and offering more space for dialogue based on equal chances among its participants (Evans et al. 1999). Through World Wide Web (WWW) dissemination of information can be enriched far beyond image and animation towards sound and other representational aids. Its big potential to facilitate multimedia-based collaborative planning systems opens wider opportunities and room for communication among participants who are usually put aside in conventional urban revitalization program (Shiffer, 1995; Evans et al., 1999; Ceccato and Snickars, 2000). These IT capabilities complemented each other. Hence its interface should lead to a model of multiple representations in which urban development information can be traced. For structured organized participants, such as local government, public institution, developers, or contractors, this representation, which is bundled in an integrated urban information system, may be said causing no problem as means of project communication.



Therefore regarding local inhabitant, visualization should focus on what becomes people's concern about the project by taking into account potential of local resources in providing access to benefit people. This should be explored in a digital multiple representation project. Rather than intimidating people, visualization in this sector at least has role to stimulate people about the importance of revitalizing their neighborhood and to generate their better understanding about the urgency of the new housing model (Pietsch, 2000; Donath and González, 2001).

### 3. Methodology

Basically the research employs descriptive method. Research works are focused on building digital model based on multiple representations. It uses a standard sequence of a resettlement process established by Department of Public Works (Departemen Pekerjaan Umum Propinsi Sumatera Utara, 1995), as shown in Figure 2, as basis in developing digital model. The model visualizes the step-by-step resettlement process from the people's perspective side. We have identified particular stages that have the most potential of visualization projects to be implemented to facilitate and to accelerate urban resettlement program (stages with grayed box in Figure 2).

Model evaluation in this step is conducted by participants of previously established CBD forum, which employed conventional communication (paper-pencil based). The resulted model of this ongoing research projects is to be tested directly to local people and this is beyond the scope of discussion in this paper. The socialization-to-local-people stage will be proceeded due to the completed of final digital model of resettlement process and is projected to be started in the year 2004. The resulted model is designed for representative of local people, not to whole inhabitants. From previous research, it is impossible to create a digital model that can be used as communication for all inhabitants. Therefore establishing representatives as nodes for computer-based communication is suggested as the most effective method (Hamid and Defriza, 2001). The representative typical background acts as basis in developing digital model regarding visual perception and computer skill considerations.

Since the setting is in a third world country where Information Technology (IT) tools and its infrastructures are still considered expensive, this approach has to be simple considering the limitation of local resources. This presumption has to be taken in guaranteeing sustainability aspect and in minimizing cost. Another significant presumption is the model should have capacity for accommodating people participation since early stages. Various model of collaborative design can be adopted. Main principle is to include as many people's information needs as it could for multiple data sets to form an

ideal visualization, especially cost-affected information. As it is developed in the framework of urban project, its capability to integrate with other institution system should be anticipated either. Therefore the resulted community-based model is economically reasonable to be implemented physically.

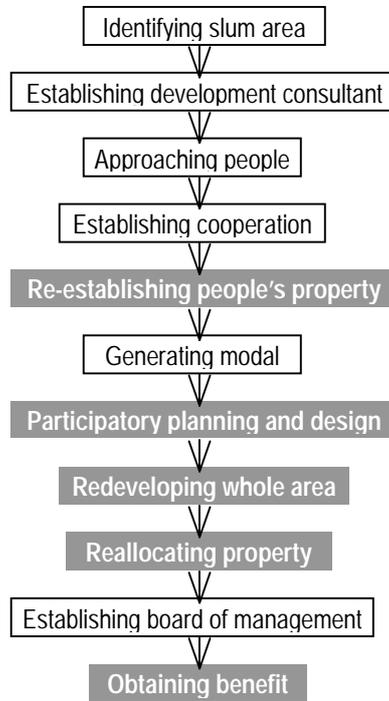


Figure 2. Sequence of resettlement process in a CBD context

Case study area is an existed slum area on a 39.54 hectares site, which is strategically located on downtown area of Medan, a city of more than two million in population. Of that total area, the model took sample of a 1.4 hectare site that can represent potential character of whole area. The model would be developed based on preliminary CBD project, which only represented the final proposed model then. Computer functioned very limited, only as production tool. To complement the existing data, a complementary survey is induced for getting more information on technical aspect and on visual perception character of local people. Result from this survey supplies information for generating more comprehensive model that can represent generative changes since the existing condition until post resettlement process.

Method to develop 3D from plan is also directed toward development of method that can easily executed by lower skilled person in operating Computer-aided Design (CAD) program (Lewis and Séquin, 1998). Basically, the interface model was developed from preliminary model by Hamid (2001), a user-friendly interface in anticipating possibility of lower skilled person of local people who have been authorized to operate local information center.

#### 4. Observations

Building models are represented as sequential model following planning and design process in CBD context. All models are built and developed by using CAD application program and perfected with common rendering and animation application program, and VRML models. Models and textual information are bundled in a web databases and can be accessed through simple windows frame displaying an integrated information system. All works are integrated with academic works as part of integrated academic-research program in the institution where author and other researchers involved.

Housing model representations are ranged from visualizing changes of housing building context, which is merely integrated 3D model into existed IISURP interface as shown in Figure 3, to visualizing alternative of interior plan model through VRML model, as shown in Figure 4.



Figure 3. Visualizing changes of housing context, before (left) and after (right) resettlement, within IISURP interface

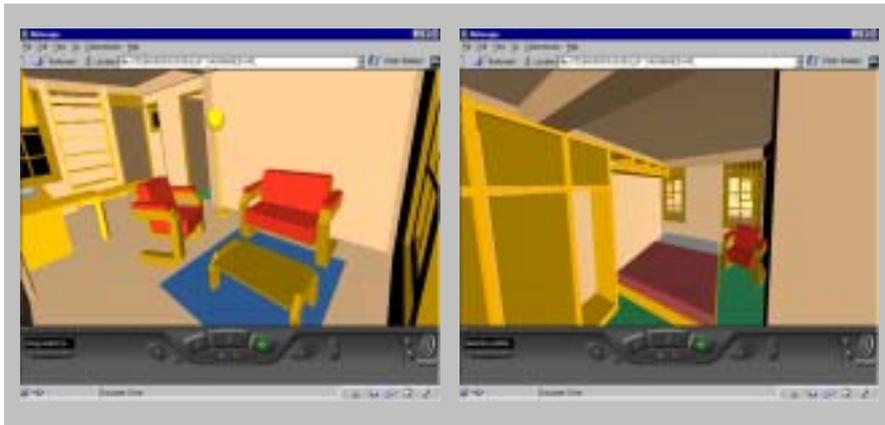


Figure 4. Interactive VRML model showing alternative of compact living room and kitchen (left), and compact bedroom (right)

Model are built based on previous typical housing units has been offered. Basically all alternatives of housing units are derived from house modules. There are three modules based on probable maximum area of housing unit, each is housing unit with maximum area of: 36 m<sup>2</sup>, 72 m<sup>2</sup>, and 108 m<sup>2</sup>. All possibilities are recorded in digital model and can be explored interactively. This is based on similar digital modeling cases about possibility of housing unit development based on shape and lot area (Asami and Ohtaki, 2000). In this project, each typical module is developed based on 3D shape area and built as an interactive VRML model. Each model can simulate every possibility of construction configuration based on prefabricated construction system, which is the chosen construction system for housing building project. As shown in Figure 5, configuration of housing units that can be derived from each module is based on configuration of wall partition and upper floor.

Structure of information inside the prototype becomes significant aspect in order to have a seamless information package built from various modes. Aspects of data to be includes can be grouped as following: cost implication aspect, resettlement mechanism, development pattern, construction, and urban infrastructures. 2D and 3D model become main reference for indexing all related data. Method for compiling each information aspect is developed by using simple application program (common spreadsheet, databases, word processing, and modeling program). This considers the limitation of existing resources to sustain and to develop future model. Web-based visualization becomes the option for representing information in anticipating different format of potential urban information system available at other institution. Through WWW the system is capable to be integrated efficiently with the prototype.



*Figure 5. VRML models as based for configuring housing unit, each is module with maximum area  $36\text{ m}^2$  (top left),  $72\text{ m}^2$  (top right) and  $108\text{ m}^2$  (bottom)*

This visualization principle is taken into account by integrating various types of information into an object-based multiple representations (Figure 6). This interface prototype displays information of a housing unit that becomes viewer's choice regarding his/her affordability and other considerations. The object criteria includes construction system, which is displayed as option of prefabricated construction modules; location of housing unit in the apartment building (ground floor, upper floors, close to vertical circulation, on the corner, etc.); and configuration of interior partitions. The option will lead to resulted information regarding cost, compensation (if cost beyond financial affordability), alternatives for building material or finishing, and procedures.



Figure 6. The main interface displaying multiple representations

## 5. Conclusion

As feedbacks from several socialization sessions among concerned participants, there have been valuable inputs that can be referred to improve and develop the prototype, before socialization on people take action. CBD would have benefit from this potential prototype in accelerating its implementation, especially in bridging communication gap. The visualized building model should include conceptual phases when early housing unit is generated from scratch. This would simplify and accelerate modeling process in term of CBD program. Building regulation, such as that concerning building envelope, building coverage, floor area ratio, should be visualized too. Furthermore, information regarding non-physical-regulation such as building and land property tax should be visualized as part of stimulating people to realize the relationship between importance of paying tax and urban development program.

Due to target group of this model are local people who mostly belong to low-income groups and have limited background or even no skill at all to access the information; the operation of the model needs facilitator. The resulted model indicates need for determining level of communication among inhabitants. This level of communication will act as basis for determining local persons who will be projected as local representative to handle model customization.

We also found that there is prospective function of VRML model to be basis of information nodes. This is referred to the facts that during

socialization this model has attracted the most attention and has generated a lot more idea about the resettlement process than any other model in the IISURP. One of the potential of VRML model that should be explored further is its capability in generating real time editing method through the Internet, where input or aspiration from people can be accommodated (Jung, Gross and Do 2001). This could be achieved by providing facility for putting comments, giving new proposals, editing proposal drawings, etc.

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