

IMPLEMENTING INFORMATION TECHNOLOGY: AN ALTERNATIVE FOR URBAN RESETTLEMENT PROGRAM

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ABSTRACT

Revitalizing slum-area has been recognized as one of the most complicated parts in urban resettlement program. With such a context we need a particular mode of communication to initiate and generate the project based on people's own aspiration. There are problem characteristics here, which are usually executed by Information Technology (IT). It is a potential to overcome the problem by using IT based on its ability to manage abundant information with various variables. At least there are three prospective opportunities in applying IT in this area. Firstly, it is the role of visualization, where computer can execute several visual features of the projects, which will be more representative than the previous ones. Secondly, it is the role of IT in generating the customization process to everyone involved in the projects. The last is the role of IT as executing tool for project's database management.

Keywords: Information Technology, Urban Resettlement, Slum Area, Computer-Aided Facility Management, Design Database.

INTRODUCTION

Housing supply system usually becomes one of the most-handicapped problems in implementing an urban resettlement project. There have been only a few good concepts equipped by mechanism of how to apply it and also the final design of the buildings. Although more frequently those steps were hampered by the fact that application of those concepts is not as simple as it was described on the paper.

This kind of project is really a complicated one; it involves a number of people with their own characteristics, as many as their number, most of them are low-educated, and based on their economic difficulty they put improvement of their built-environment on the last priority. People don't get a right picture of the resettlement process; they are not sure that the future forms of their housing will give them a better environment; and they are not sure how they can get the house based on their recent income. There are also some doubts about the feasibility of building technology applied on the projects, which is proposed using fabrication method. The technology isn't well recognized and it has made people doubt how far this technology can adapt their typical built-environment, as they need (Schutz, 1992 : 238).

THE URBAN RESETTLEMENT PROGRAM FOR SLUM AREA

The overgrowth population of most big cities in developing countries has produced almost the same phenomena on their physical performance. Large flow of people in urbanization process has produced many slum areas. Most of these people have to recognize that they cannot afford dwellings with standard quality. Ironically most of these slum areas are in strategic location, such as in downtown, which has high-economic value. These phenomena are reasonable. Some of them work as a low-level employee at local business sector, and the others run their own business as a support for more established business in the area, and most of them are informal, such as: food stalls at illegal bazaar area. The land status is varied, mostly are state-owned land without any legal certificate, and a few are self-owned land.

Their strategic locations along with the strong aim of local government to have an ideal city have made these slum areas a potential target. As it can be reflected from the above description, the complicated problem existing in the area has made the effort difficult to be implemented. Different perception of each involved party is the most handicapped factor:

1. People cannot capture the real picture of what their built-environment most likely in post-development era.
2. Government cannot see any other alternative than moving people away from the location and giving payment as compensation for their property. It seems that they cannot get the ideal model of revitalization of existing ideal concepts.
3. Private sectors are not convinced about the prospect of the projects in economic perspective.

POTENTIALS OF IT APPLICATION

Potential referred to Webster's dictionary means something latent that can come into being and be useful for certain extent. One ambiguous and relative term is useful, since it can be useful for certain condition but has little effect or even negative impact for another one. Consequentially, potential of Information Technology (IT) application for resettlement project case has to be explored totally. It isn't as simple as saying IT has a great potential concerning its performance, which is very helpful in customizing the project among local inhabitant, not to speak its fancy products. The project isn't intended only for customization, there is a manifestation phase, which is much more complicated and involving more variables too. Although it cannot include all aspects because the broadness of the issue at least the main factor for determining the potential can be comprehended.

Since there is no project that has applied the program totally, and most were halted during planning process, it is difficult to evaluate the potential by making comparative study with previous project. Hence, as a generator it would be better if a few projected and critical questions are stated here, so that in the end of this paper we can find the answer of how far IT can generate this project. Questions such as whether IT have more advantages than any previous similar project which is not IT-based, or in what aspect IT can bridge the existing communication gaps in revealing the project, or in what aspect IT can have a role in facilitating a project initiation, might direct to a more critical thinking. Principally the topic brought to surface isn't only caused by a lavish-adoration of new technology. What Eric Teicholz mentioned in his book Facility Management Technology can be a good reference: "What will be important for

management and users is to have a basic understanding of the power and limitations of technology, and to learn to deal with the changes caused by technology." (Teicholz, 1995 : 54)

Database Management

As it was mentioned previously there has been found some obstacles in initiating the project. The most identifiable one is the complexity of participants involved in the project, which in turn leads to a complicated information and interrelationship that should be executed in the project. This fact indicates similarities with those of an area in architecture field, which is known as Facility Management. There are several definitions of Facility Management indicating its position in an evolving fluid. Yet, we can state one by International Facility Management Association (IFMA), which is elaborated, by Jim Steinman as a reference for conceptualizing its relationship with urban resettlement mechanism. According to IFMA, facility management is defined as "the practice of coordinating the people and the work of an organization into the physical workplace." While Steinman defined the field as "the systematic method of inventorying, planning, designing, allocating, and maintaining space, equipment, and furniture for general or special purpose facilities that are subject to a need to be flexible to accommodate change." (Hamer, 1988: 1) Furthermore Steinmann suggest some points as facility management goals:

- Replace reaction with action
- Plan for the future
- Improve space utilization and efficiency
- Promote user involvement
- Improve productivity
- Maximize return on capital investment
- Minimize present-value life-cycle cost
- Provide qualitative support of the enterprise/business process
- Satisfy users (Hamer, 1988 : 1)

Based on the definition and the objective, facility management relies on database as the core of its activity. Since databases in facility management grow more and more complicated, it's reasonable if the databases execution cannot be separated from IT as the execution tool (Hamer 55). Therefore, it's reasonable to say discussing facility management automatically means discussing IT issues, which leads to the term of Computer-Aided Facility Management (CAFM). Companies were no longer asking if

CAFM was being used, but *how* and *where* technology was being employed (Teicholz, 1988 : 3).

The definition and the objective of urban resettlement program and facility management indicate the same atmosphere unless the condition in facility management is more real since most of its physical aspects are already exist (Figure 1), while in resettlement process all function are abstract in accordance with its condition in planning or sometimes in negotiating phase. Here is an advantage of using facility management as reference point since database conducted and used in resettlement phase would be a useful input for post-development operational phase.

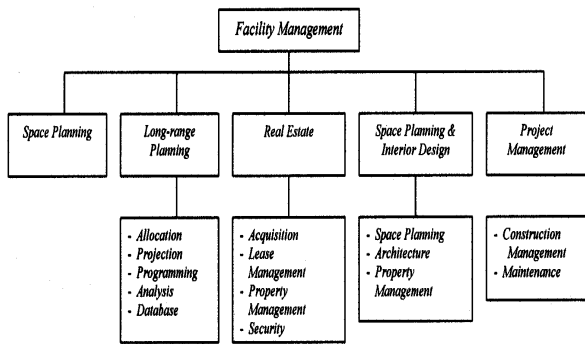


Figure 1. Facility Management Overview (after Hamer fig. 1-6)

Principally what can be identified as the first point of potentials of IT application in resettlement process in its reference to facility management is the importance of databases and the existence of IT as the tool for executing it. In the resettlement mechanism ever developed so far, the approaching people phase notifies the beginning of exhausting planning and design process. The process can be described as a linear design process (Figure 2). Design process were started with design customization to local inhabitants following principle of community-based development. In this phase the trouble has been very awful concerning the number of people's aspiration having to be accommodated, since ideally according to community-based principle, design phase should be executed on case-by-case basis or at least on local group basis. However by using the ordinary method the principle seems to be impossible to be implemented. After accommodating people's aspiration the process itself still needs long way, it should be reviewed with developer or investor, as well as with local government. Briefly,

flexible and efficient design process along with simple feedback steps is urgently needed.

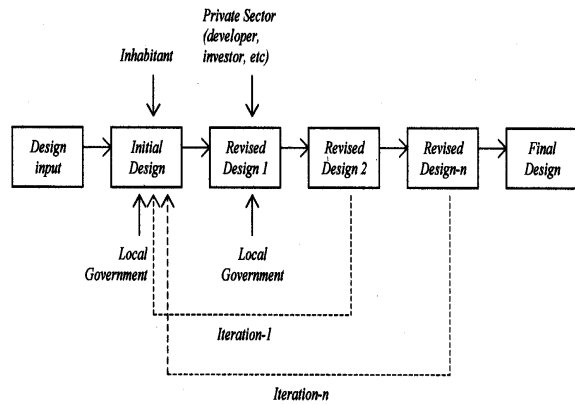


Figure 2. Design Phase without IT

Through IT application, design process in the initial phase can be executed simultaneously among participants involved in the project (Figure 3). This is enabled by the existence of design database as design approach reference and IT as the executing tool. Negotiation between people and private sector, as the project financier, can be managed more effective and efficient. Design changes can be executed easily, which give way to easier iteration steps, which is usually needed in this kind of process. Certainly, only design databases relevant to certain negotiation can be retrieve in each step. More detailed data, such as window models or the number of bedroom for each unit, shouldn't be included in the databases for negotiation between cooperative and private sector. Information about the percentage of the area for housing in project site or the price of certain housing units will be preferable.

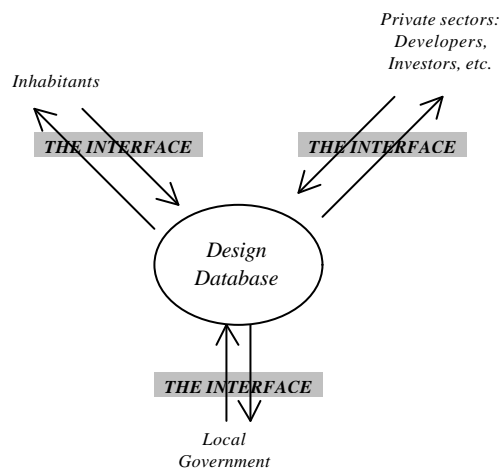


Figure 3. Database System in IT as Framework in Design Phase

Customization to Inhabitants

By creating framework either in term of building structure or in term of design order as the limit of flexibility beforehand, the IT process will enable people to participate in design process based on their own background and their subjectivity. This approach had ever been implemented in Vienna, Austria and was valued as a successful one. The project used CAD systems as participation tools. Following points are the main advantages obtained from the application:

- Communication between the inhabitant and the architect is cleared of unnecessary details. Therefore it can concentrate on the most important issues.
- Graphic and budgetary information is reliable as a basis for decision-making instead of tentative estimates.
- There is more and better motivation and identification with the dwelling and its environment by the inhabitants themselves (the dwelling is really planned by the person herself or himself) (Uhl 276).

Considering inhabitants involved in most of Resettlement Project in Indonesia are less educated and not too accustomed with the template like those in Vienna's project, the targeted IT system should be more interactive. Yet the project in Vienna was held in 1986, while CAD system has been much more developed up until now. Hence it is realistic to apply the same approach for the project. Cost estimation will not only be a pricing information interface apart from graphic interface. (Figure 4) CAD system along with its supporting programs can create various animation including the development phase of each housing unit, which is very close to real world. Its simulation enables people to get accustomed with the design aspects easily.

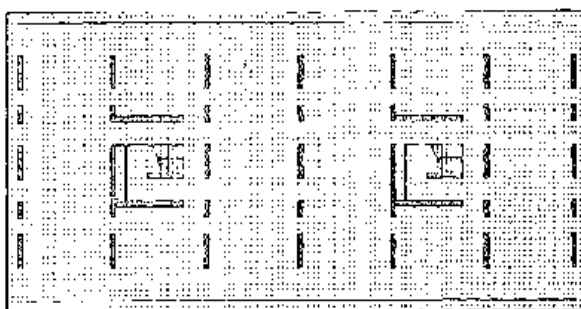


Figure 4. Print-out of Primary Structure in Vienna's Project (after Uhl fig. 1)

The process will be more stimulating, since graphic solution can be directly interconnected with non-graphic data (Figure 5 & 6). People can understand the consequence of their own design option, not only from their own perception through several computer animation but also from spreadsheet interface describing their affordability to have housing unit offered based on their economic background.

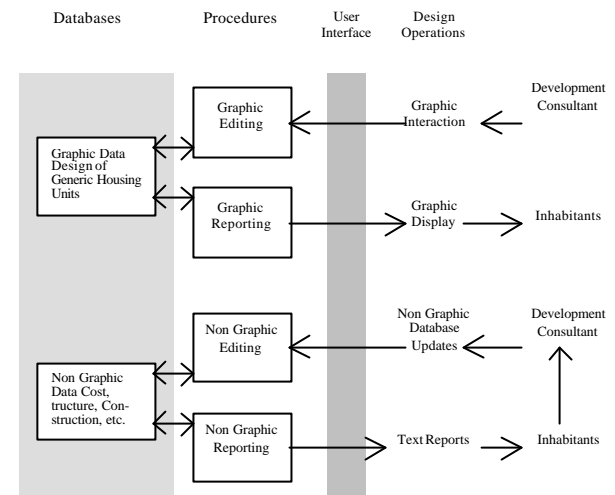


Figure 5. Structure of CAD System in Initial Phase (adapted from Mitchell fig. 16.12)



Figure 6. A User-Friendly Interface Model (taken from Hamid, 1998)

Customization to Private Sector

Private sector involvement, either developer or investor, is quiet rarely discussed in recent mechanism, except a little in conceptual stages concerning its role which is expected to be involved in the project. Meanwhile its existence is one of the most essential aspects in guaranteeing projects implementation, since the project is financed mostly through their

participation. Probably it dues to the main development principle of this project, community-based development, where the development should be started from people, so that negotiation can only be administered after design phase with people finished. Consequently this mechanism has a possibility to find a deadlock because of private sector disagreement with the design decision already made. Again, the frustrating back-and-forth design process begins. Referred to Figure 3, IT application can bridge this problem since it enables the process running simultaneously among every group involved. Following is the main advantage in this context:

1. IT facilitates resettlement process because of its ability in involving private sector participation early in the process.
2. IT will accelerate resettlement process.

The link between graphic and non-graphic data in IT application will also be useful in customizing process to private sector (developer). The possibility of developing commercial facility based on the condition of housing, which its design decision has been fixed before, can be evaluated critically through simulation of graphic and its linked non-graphic databases simultaneously.

Facilitating Urban Management and Resettlement Program

Urban management, which its application in resettlement program couldn't be defined so far in recent mechanism, can be achieved since there has been database for each local project, which has implemented IT system. These projects, assumed as prototype, can be used for any other similar project anywhere. Even it can be extended beyond the local condition to national context since the variable of IT application in this kind of project will not have any extreme difference between one and another. Government doesn't have to allocate same amount of budget and have dilemma of questions on which location has priority this year to be included in the program. No more preliminary study is needed every time a project is started, only updating database system according local context (Figure 7), such as: updating complete attributes for local building materials or updating local building codes.

It is also possible to implement database management to similar projects excluding slum-area or pure commercial. It can be executed by

ignoring inhabitants factor participants in participants' variable and housing factor in design's variable.

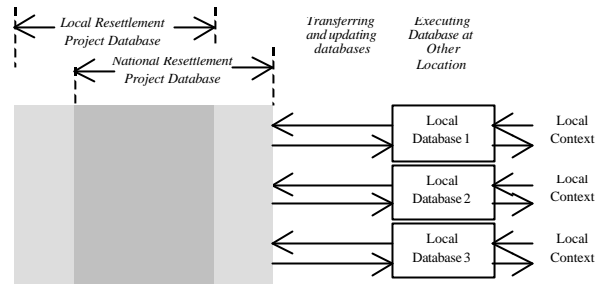


Figure 7. Building Resettlement Project Database of a Local Project

Facility Management Database

By using CAFM as reference model to develop databases in resettlement phase, the mechanism will facilitate application of CAFM in post-development phase. Board of management will get additional advantage since they don't have to conceive database for CAFM. What they need is only updating data for further project's operation and maintenance and discarding any data irrelevant for operational phase (Figure 8). This will also put another additional value for every project since CAFM will be automatically applied and will be assuring sustainability of the project. One thing that always intimidates experts in this kind of project is a possibility of the area returning to slum condition.

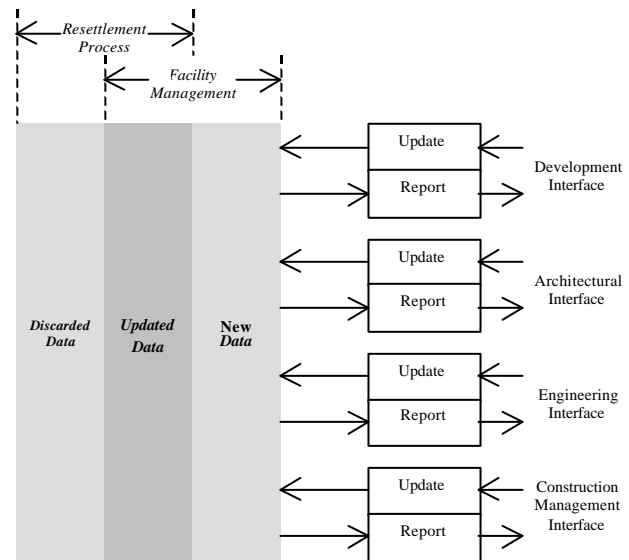


Figure 8. Projects Database as Initial Project Database for Facility Management or Post-development Phase (adapted from Mitchell fig. 16.13)

FINANCING THE IT

Eric Teicholz in his book *Facility Management Technology* described the major elements of cost in CAFM are as follows: 1) systems costs, including hardware, CAD and facility management application software, 2) database creation, usually the most costly part, 3) user's training, 4) system maintenance, 5) space, the area taken for the equipment plus a special environment, 6) materials, such as storage media, diskette, magnetic tapes, etc., 7) staff time (Teicholz 44). Among the seven, the first and the second are the most costly components. For database creation, it is not uncommon to allocate up to \$ 1.00 per square for creating the initial comprehensive database for various facility applications (Teicholz 45). Yet it is in American building construction context and the database conceived for facility management is more detailed than those for resettlement process. Therefore it is realistic the standard applied in resettlement process in Indonesian context will much more reduced. It also need to be noticed that both cost components in the context of all system in resettlement program which consists of several similar projects throughout Indonesia only need to be spent once. Assumed there is a pilot project, it could be directed to be a format for the main system and databases for the program. In the next projects the organizer only updates or improves data. Consequently this will also influence other cost components. A relatively big budget will only be allocated for the first project.

If we refer to Figure 10, where national database defined as primary system and local database as secondary database, so for other projects following the first local project what they need only secondary allocation, which much less priced than the first one. The cost component is not as complicated as the first project, since for the system they only need a secondary system, which will be connected to the mainframe at database center. Here we find a potential of Internet as the supporting factor in order to make the system more and more efficient and effective. Space needed for secondary system can be fulfilled by local organization that handles the project and it is possible to use its existing resources such as a research lab in local campus, if the organization handle the project was an academic one. Special space is made only for main database, for instance at the Department of Public Works.

Components no. 3) and no. 7) will be more related to the aspect of who will handle IT in the project (to be explained next), and more dependent on the form of the organization, which also has potential for cost-efficiency.

As an illustration, recently the Government of Indonesia, under coordination of Department of Public Works, has allocated a budget of Rp. 250 million for planning cost of each project in several metropolitan areas projected to be involved in the Program. The financial resource itself came from the annual government budget and international financial aid program. All projects are halted, some only came into preliminary study, and the most progressive could proceed until project establishment phase (still paper-based phase).

WHO WILL HANDLE THE IMPLEMENTATION PROCESS?

Based on resettlement mechanism previously discussed, there should be a center party that has the role to facilitate and manage all communication among the involved party. In recent mechanism it is recognized as Development Consultant. While from the same perspective in the proposed IT system, we already have a centralized database system that has the role to accommodate and systemize all information concerning all involved participants (Figure 3). Therefore it's reasonable if Development Consultant has the greatest potential in managing the project, which automatically managing IT. At least it might be a division of the development consultant itself. Nevertheless, assuming the first project gets success, it is also possible that development consultant will be totally applying IT in next projects. This leads to further question, "Who is the most appropriate to obtain the role in the context of Development Consultant?"

There are already two groups of people interest in such kind of project, those from non-governmental organization and those from academics. The author tends to direct this program to the last group. Besides some political reason, which is beyond the scope of this paper, the author based the tendency on recent experiences in the academic environment. There are many opportunities in connecting this project to academics. For instance, it can be a setting for professional practice courses. Professional practice, as part of academic curriculum in

architecture education in Indonesia, is still debatable up until now. There is no ideal format of this course agreed yet, since the fact indicated that most of architect's graduate didn't work on design field as projected/simulated in professional practice. This new area will be a realistic alternative.

One indication of the facts is most of recent development of such a project were pioneered by people from academics. Even some of them have developed a group of interest in this area. There are several benefits that can be expected from these people participation. They are non-profit-oriented and their academic commitment would make anyone involved more assured about an ideal IT application. The project may be integrated with one or more academic programs, or at least courses. They have students, which can be involved as "low-cost but valuable project instrument". This is an important aspect since from previous discussion the approach to people by using IT in customization phase is done with man-to-man method. Students, as part of development consultant, will be acting as field-worker, facilitating inhabitant in participatory design phase by using CAD interface containing database concerning the initial step. While senior member of consultant, fellow researchers or faculty members involved, will be acting as design negotiator representing inhabitants design decision to private sector and local government (Figure 9).

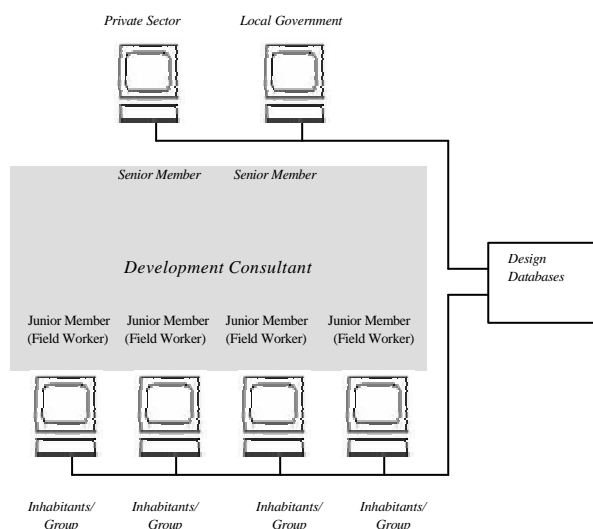


Figure 9. Development Consultant as The Main Operator of IT Application

CONCLUSION

IT has big potentials to be implemented in facilitating urban resettlement program in Indonesia concerning the importance of developing databases for resettlement process and its mechanism. However what has been discussed in this paper tend to be qualitative analysis. Although in some parts the author couldn't avoid from attempts to define some questionable system, there should be further detailed analysis stressed on IT environment itself. It can be either supporting or conversely, weakening the idea. Through IT application private sectors participation can be explored in more realistic manner and it is different from recent mechanism where their involvement seems to be artificial. This makes the project more applicable since project cost mostly generated from the existence of private sector participation.

A concrete step of resettlement process needs to be defined. However, it is clearly a complicated matters and there are potentials of using IT in order to bridge all complicated aspects involved because of the IT characteristic.

IT application in this project shows an ideal format of its application in developing countries, where a controversy usually emerges between the need to apply new technology to accelerate the development and losing job field because of its application.

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