

STUDY ON STANDARIZATION OF ENFORCEMENT DESIGN IN UBIQUITOUS CITY (U-CITY) SYSTEM

Taewan Kim¹, Sung-Nam Hong⁴, Changdu Son³, Junhyun Park³, and Sun-Kyu Park²

¹ Research Assistant Professor, Sungkyunkwan University, Suwon City, Korea

² Professor, Sungkyunkwan University, Suwon City, Korea

³ Graduate Student, Sungkyunkwan University, Suwon City, Korea

⁴ PhD Candidate, Sungkyunkwan University, Suwon City, Korea

Correspond to tk776@skku.edu

ABSTRACT: A city development has been focused on solving a housing shortage of city resulted from rapid industrialization and population increase in city. However, such a development has caused many problems in environment, economy, safety, and so on. In recent, therefore, a new paradigm of a city development is required, and thus ubiquitous city (U-City) concept appears. U-City development, which combines construction method and IT technique, creates a new composite space, and help people improve quality of life in terms of solving many problems caused by existing method of a city development. However, there is no guide to build U-City up to date, and most present U-City projects have processed following past method of city development. Therefore, an objective of this paper is to suggest an explicit procedure of enforcement design in U-City system..

Keywords: Ubiquitous, Enforcement Design, Design Procedure, City Service

1. INTRODUCTION

Construction industry has developed a city for solving a housing shortage due to increase of urban population. As the result of oversupply corresponding to the demand incoming to cities, a city has been disorderly developed and citizens' life have been worse. To solve for development thoughtless for the city, a new concept of city development was necessary. Such needs of the times pushed the concept of Ubiquitous City (U-City) into limelight because U-City is expected to improve space problem caused by people's city incoming and additional problems resulted from population increase, which could be environmental pollution, safety, traffic, worse living quality in a city, and so on. The lexical meaning of 'Ubiquitous' is 'Seeming to be everywhere', and a definition of U-City is a city to offer city services every time and everywhere. In detail, city development is processed by convergence of construction field and Information Technology (IT), and thus urban space problem can be solved due to the integration of physical space and cyber space. In addition, this convergence makes citizens to conveniently take various services by

ubiquitous access of the cyber space. However, the processing U-City plan or project meets the difficulty because of nonexistence of an appropriate procedure about U-City development. Each step for design procedure in U-City development system should be processed reflected by not only construction needs but also IT needs, but up to date the step is mainly performed by construction method. Therefore, this paper tries to propose a procedure of an enforcement design that is a core step of city development.

2. Entire procedure of U-City development

The whole procedure of U-City development may be defined modifying the conventional procedure of construction field. The constructional procedure usually consists of 4 steps, which are definition of design requirement, preliminary design, enforcement design, and establishment of performing plan. Each step mentioned is composed of typical items in construction and IT items. Figure 1 shows entire procedure of U-City development

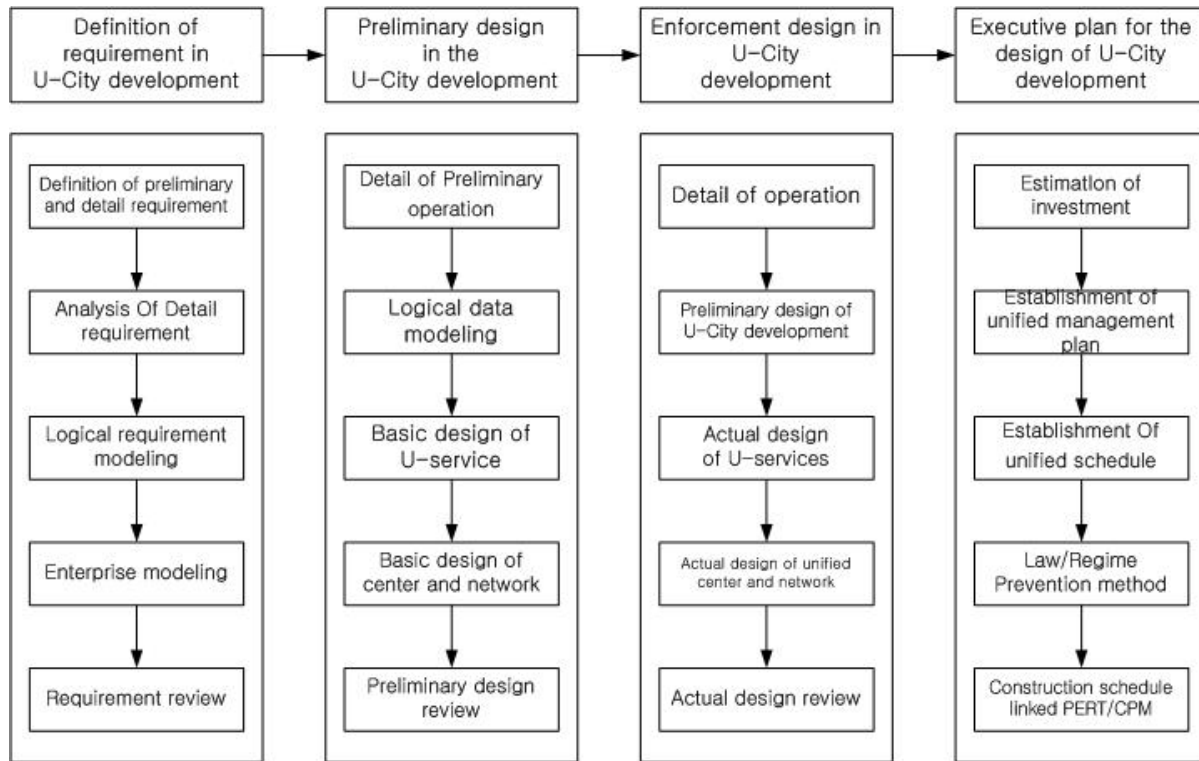


Fig. 1 The entire procedure of U-City development

2.1 Definition of design requirement in U-City development

There are many demands from a client to a contractor when in developing a city. The client can be a local government, and constructional and IT companies can be contractors in case of U-City development. In general, a client sets a goal and requests a contractor to reflect it's intend in establishing a city. Therefore, the contractors try including client's requests and defining the requirement items in their design. The requirement items are generally listed with the agreement between the client and contractor, and the listed requirements are classified as basic and detail. Afterward, the listed requirements are logically analyzed and modeled. The modeled requirements are examined whether to correspond to common purpose both for client and contractors, and the requirement items are finally defined as the first step of U-City development.

The required items in U-City development should be defined considering various situations for citizens, enterprises, and public institutions. For people, the requirements for U-City services in order to improve quality of life and guarantee individual safety in the city are defined. For companies, the requirements focused on supporting business are defined considering economy, rapidity, and efficiency. And, the requirements for government are defined with common benefit, environment, and public safety..

2.2 Preliminary design in the U-City development

After defining requirement of U-City development, a procedure of a preliminary design in the U-City development should be developed to establish basic concept of enforcement design. The first step for the preliminary design is to define conceptual idea of preliminary management. Afterward, a basic design of unified operation center and network is performed with development of logical data model and basic design of U-services. This whole procedure is finished after examining the preliminary design.

2.3 Enforcement design in U-City development

Enforcement design in the U-City development is a process to realize preliminary design. In this step the results throughout preliminary design are changed to concrete concept, model, and platform. The procedure for enforcement design consists of definition of concrete concept and design of urban unified platform based on logical data model from preliminary design. In addition, unified operation center, U-services, and urban network from preliminary design are in detail redesigned, and the whole procedure of this step is examined. The detail explanation of enforcement design will be shown in chapter 3.

2.4 Executive plan for the design of U-City development

As the last step of U-City development is to set up an executive plan for the design of U-City development. The plan is focused on besides design and composed of budget estimation, operational scheme, schedule, correspondence of legislation, and construction management. The first is to set up budget, which is mostly sensitive in developing a city, and next operational scheme and schedule are planned based on the budget. Afterward, how to correspond legislation of U-City development should be considered. At the last step, process control should be discussed involving concept of construction management, which is PERT (Programming Evaluation and Review Technique) and CPM (Critical Path Method).

3. Procedure of enforcement design in the U-City development

The whole procedure of U-City development was introduced in the above two sections. However, an appropriate procedure of enforcement design in the U-City development, which is considered as the most important step, was not mentioned, and in this section a detail procedure will be proposed. The proposed procedure is shown in Fig. 2. The first step of the enforcement design is to define a detail of operation. And, next step is to design a unified platform for U-City and U-services. Afterward, a detail design of unified center and network as city infrastructure is defined. Finally, how to organize each procedure and unit service should be planned.

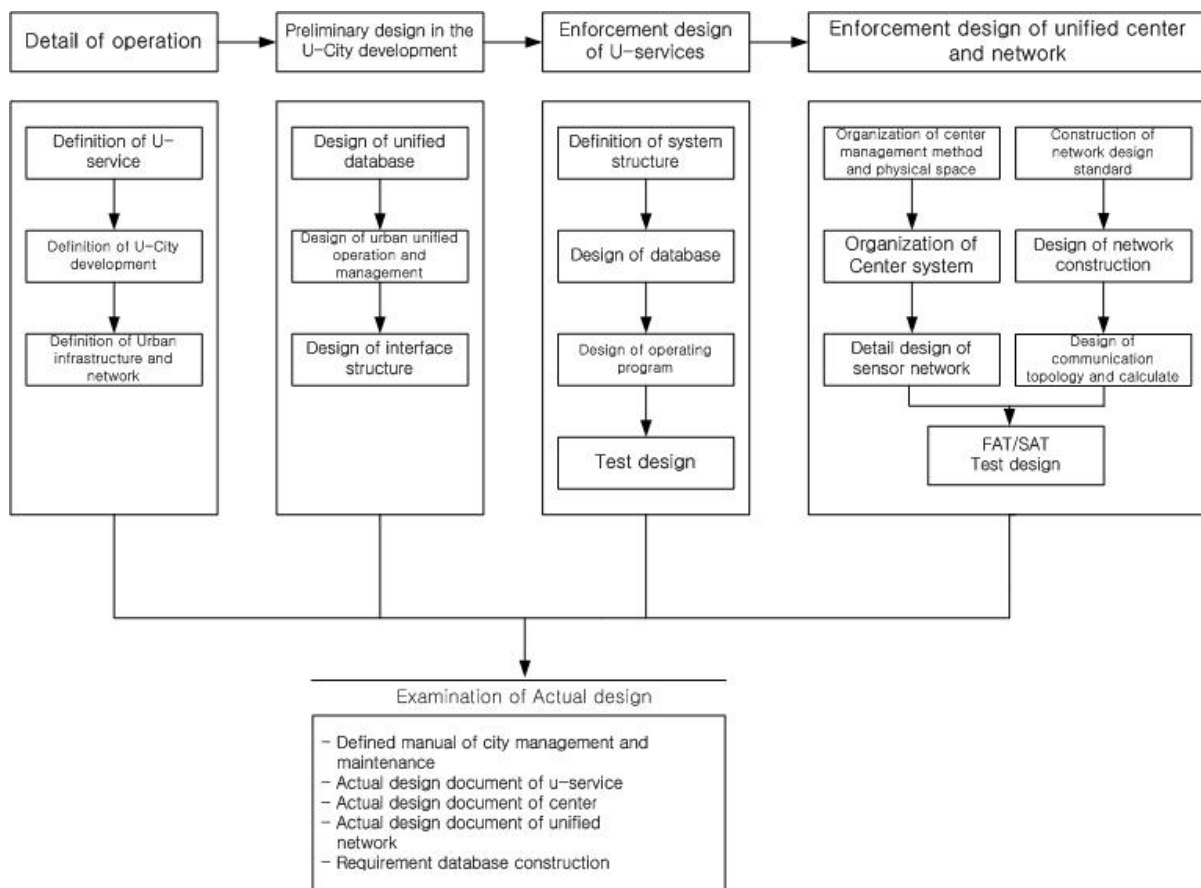


Fig 2. Procedure of enforcement design in the U-City

3.1 Detail of operation

The definition of operational detail is classified as U-service, unified center, and city network. The conceptual definition of U-service consists of transportation, environment, administration, facility management, and security, which are called U-City 5 public services. The conceptual definition of unified center is for main group of U-City management and for physical space operating U-services. The conceptual definition of city network

includes connection between public network and commercial network as a basic infrastructure in order to support U-services.

3.2 Preliminary design in the U-City development

A unified platform should be designed as a procedure of enforcement design in the U-City development. This platform unifies and controls all the data and hardware/software provided in the U-City system. In the

design of the urban unified platform, the first consideration is to design unified database based on the logical data model in the preliminary design, and unified operational management system should be established considering the unified database. Afterward, the database and the system will be connected with design of interface structure, which considers extension of program, and urban unified platform will be designed.

3.3 Enforcement design of U-services

An enforcement design of U-services is to realize urban unified platform operated by unified center, which provides services. This step includes definition of structure among database, operational management system, and unified platform, and designs a detail structure of database and program operating the detail structure.

3.4 Enforcement design of unified center and network

In this step, design of unified center and network is necessary to provide U-services. An enforcement design of the unified center consists of physical space layout and detail design of system inside the center. The unified center functions to collect urban information of transportation, facilities, and network, and to analyze and manage the collected data. An enforcement design of the network includes distinction between public and private network, development of design standard using wire/wireless tool, and physical design standard of communication pipeline and railway line. In addition, communication capacity equation is derived from estimation of consumer's cost and communication capacity. This enforcement design of unified center and network will be examined by FAT (Factory Acceptance Tests) and SAT (Site Acceptance Tests)

3.5 Examination of enforcement design

This step is to review the whole procedure of enforcement design. The review consists of examining capacity of the whole system and examining detail capacity of each service

4. Conclusions

It is claimed for many new cities to be built with concept of U-City, but there is no procedure for U-City development. The building cities refer to examples of past city development or non-standardized design procedure. Therefore, this paper shows an outline of design in the U-City development, and proposes a procedure of enforcement design. These outline and proposal should be refined in near future. This is why a design procedure must include cultural characteristics, environment, local resident, and so on. It is necessary to ultimately develop a procedure including site selection, plan of land development, preliminary and enforcement design, construction, and building completion. It is also necessary to develop a construction process to perfectly replace

existing urban planning process.

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