Chapter 8.3
u-City:
The Next Paradigm of Urban Development

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ABSTRACT

u-City is South Korea's answer to urban community challenges leveraging ubiquitous computing technology to deliver state-of-the-art urban services. Korea's experience designing and constructing u-City may be a useful benchmark for other countries. This chapter defines the concept of u-City and analyzes the needs that led Korea to embark on the u-City project ahead of others. It examines the opportunities and challenges that the nation faces in the transition stage. What has enabled Korea to pioneer the u-City concept is the development of IT infrastructure and the saturation of the IT market on the one hand, and the balanced national development strategy on the other hand. Success of u-City requires a national capability of designing forward-looking institutions to enable better cooperation among stakeholders, the establishment of a supportive legal framework and promotion of technology standardization.

INTRODUCTION

u-City can be thought as the next paradigm of urban development that leverages IT to advance urban functions by several levels. Employing IT to enhance urban functions is not a new attempt as many cities are already using IT extensively in a variety of applications such as transportation, disaster control, law enforcement and facility management (ICF, 2007). However, by utilizing new cutting-edge ubiquitous computing technologies, u-City introduces totally new innovative urban functions and socioeconomic paradigms that up until now have never been realized.

Korea is the first country to envision and realize u-City. Right after the IT839 strategy was established by the Korean government in 2003 to accelerate the development of ubiquitous computing technologies and services, the nation began to think about a variety of u-City implementation strategies that involve ubiquitous computing technologies comprehensively and, in just a little more than a year, the first generation of u-City projects kicked off simultaneously in several areas including Busan and Dongtan in 2005. In 2006, u-City found its way into official Korean government policies such as the u-Korea Master Plan and in 2007, although small in scale, u-City test beds were put in place at 6 different locations across the nation (NIA, 2007a).

During the same period, cities in other nations focused on the deployment of their IT infrastructure including broadband or wireless networks (ICF, 2007; Bar & Park, 2005). However, such initiatives were predominantly aimed to reinforce urban infrastructure, and thus differed fundamentally from u-City, which focuses not only on the establishment of infrastructural aspects but more importantly on embedding intelligence into the urban environment. Although there were some projects that also evolved around the notion of an intelligent environment, such as the Cooltown project of Hewlett Packard from the early 1990s (Barton & Kindberg, 2001), such projects were very small in size, thereby failing to evolve beyond the experimental level. Therefore, u-City of Korea deserves the title of being the first in the world to actualize an intelligent city.

This paper introduces the concept of the intelligent city of the future by reviewing current u-City projects in Korea. Notably, it will clarify underlying assumptions and government roles necessary for implementation of intelligent city projects by analyzing why Korea embarked on u-City construction projects ahead of others and what constraints the projects are facing now.

UBIQUITOUS COMPUTING AND u-CITY

Understanding u-City requires an understanding of ubiquitous computing, which is the platform of u-City. As the term u-City itself is a compound word of ubiquitous computing and city, u-City requires the deployment of ubiquitous IT services in an urban framework first and foremost.

Mark Weiser (1993, p. 1), who coined the concept, defined ubiquitous computing as "the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user." The basic idea behind ubiquitous computing was to make computers "autonomous agents that take on our goals" (Weiser, 1993). In other words, ubiquitous computing means embedding computing technologies in our physical surroundings so that virtual and physical objects may deliver services autonomously without human intervention.

Ubiquitous computing has properties totally different from those of conventional information technologies that we have used to date. Conventional IT, or "legacy IT" creates virtual space that exists only in a computer network and works independent of the real world (Weiser, 91; Schmidt, 2002). Of course, human command is needed to control the virtual space. However, ubiquitous computing infuses computers into the real world and renders the distinction between the real and the virtual world meaningless. As the virtual space communicates with the real world, human beings do not have to give any directions or orders. This is the distinction. Legacy IT essentially makes "digital space separated from the real world" whereas ubiquitous computing makes "digital space integrated with the real world."

With this understanding, ubiquitous computing has three distinct services in comparison with legacy IT. First, it supports real-time service (Fleisch, 2004). As digital space is integrated with the real world, ubiquitous computing can ensure prompt responses to events occurring in the real world. Since conventional IT relies on human input, there is bound to be room for lag and human error, an aspect that is minimal if not non-existent in ubiquitous computing. Second, since ubiquitous computing system is context-aware, it can provide the optimum solution for a given situation (Schmidt, 2002). Third, objects and environments surrounding human beings offer services autono-

An Investigation of User Behaviour Consistency for Context-Aware Information Retrieval Systems
Adam Grzywaczewski, Rahat Iqbal, Anne Jamesand John Halloran (2009). *International Journal of Advanced Pervasive and Ubiquitous Computing (pp. 69-90).*
www.irma-international.org/article/investigation-user-behaviour-consistency-context/41705