

Ubiquitous Eco Cities: Telecommunication Infrastructure, Technology Convergence and Urban Management

Tan Yigitcanlar, Queensland University of Technology, Australia

Jung Hoon Han, Griffith University, Australia

ABSTRACT

Efficient and effective urban management systems for Ubiquitous Eco Cities require having intelligent and integrated management mechanisms. This integration includes bringing together economic, socio-cultural and urban development with a well-orchestrated, transparent and open decision-making system and necessary infrastructure and technologies. In Ubiquitous Eco Cities, telecommunication technologies play an important role in monitoring and managing activities via wired and wireless networks. Particularly, technology convergence creates new ways in which information and telecommunication technologies are used and formed the backbone of urban management. The 21st century is an era where information has converged, in which people are able to access a variety of services, including internet- and location- based services, through multi-functional devices and provides new opportunities in the management of Ubiquitous Eco Cities. This paper discusses developments in telecommunication infrastructure and trends in convergence technologies and their implications on the management of Ubiquitous Eco Cities.

Keywords: *Technology Convergence, Telecommunication Infrastructure, Telecommunication Technologies, Ubiquitous City, Ubiquitous Eco Cities, Urban Management, Urban Management Systems*

INTRODUCTION

During the last few decades across the globe urban system and structures have been changed dramatically by rapid urbanisation trends (Yeung, 2000). As a result of this urbanisation process urban systems have become increasingly complex and large in scale. At the moment sustainable and efficient usage of scarce resources together with competing economic

and social priorities are parts of everyday decisions required to be made by local governments, which are obliged to employ a sound urban management system that increases the understanding of, and capacity to undertake, the strategic management of urban areas (Teriman et al., 2009). Urban management is basically a process of deliberately directing and facilitating urban development, and also an integration of the traditional ideas of planning, with its physical, economic and social concerns, and recently latched to management with its emphasis on

DOI: 10.4018/japuc.2010010101

efficiency (Davey, 1993). The application of innovative systems to support urban management and collaborative decision-making offers considerably new opportunities for the 21st century cities, particularly for Ubiquitous eco cities (U-eco cities).

U-eco city is a city that promises to provide an environmentally friendly urban milieu with advanced ubiquitous infrastructures and services for residents and visitors (Yigitcanlar, 2009a). Beyond this a U-eco city is claimed to be a sustainable city with an entire city dedicated to minimising the required inputs, of energy, water and food, and waste outputs, of heat, air and water pollution, by benefiting from ubiquitous technologies and sustainable urban development principles (Galloway, 2003). In U-eco cities urban and infrastructure planning, development and management require complex information and input from institutions, stakeholders and users to deal with spatial, social, economic, multi-dimensional and complex characteristics of urban and environmental phenomena and problems (Lee et al., 2008).

In U-eco cities telecommunication infrastructure forms the backbone network system of the management (Warf, 1998). Over the past few decades, telecommunications networks have become important infrastructure players and information and communication technologies (ICTs) form the basis of telecommunications infrastructure for U-eco cities (Hackler, 2003a). In the information era, ICTs play an increasingly important role in the planning, provision and management of urban infrastructure. Moreover, ICTs as telecommunication networks are major infrastructure management systems, and rapidly evolving and transforming into a network supported by convergence technologies that supports urban management. Telecommunication and infrastructure networks are rapidly moving from systems based on wired technology to those that are wireless and seamless digital network systems (Dourish, 2004). Although ubiquitous computing network systems have become one of the major phases in many contemporary agendas in terms of the design and engineering of computer systems, their economic, social and

environmental implications are yet to be explored (Weiser, 1991). Additionally, complexity of urban management in U-eco cities requires a new understanding including intelligent systems and tools to deal with this complexity. Given this significance, there is limited research that focuses on the implications of developments in the fields of telecommunication infrastructure, technology convergence and urban management on U-eco cities.

This paper aims to investigate developments in telecommunication infrastructure, trends in convergence technologies and their implications on the management of U-eco cities. This article is organised in six sections. Following this introduction, secondly, we introduce U-eco cities as a new city form that aims to bring sustainability, efficiency and quality of life into cities. Thirdly, we present telecommunication infrastructures as the backbones of U-eco cities and their services that play an important role in monitoring and managing activities via wired and wireless networks. Then, we discuss technology convergence and its impacts on U-eco city formation that creates new ways in which information and telecommunication technologies are used and formed the base for urban management. Fifthly, we explore the need and potentials for intelligent systems as revolutionary urban management systems of U-eco cities. Lastly, we conclude by summarising the key findings of the research.

UBIQUITOUS ECO CITIES: A NEW CITY FORM

Eco and ubiquitous cities constitute the two distinctive facades of a contemporary city. Eco city forms the visible facade, where ubiquitous city is the hidden infrastructure facade supporting information flow and services. The integration of eco city and ubiquitous city is important to improve the sustainability and quality of life in cities. Therefore, the traditional quartet of urban planning, human-architecture-city-society, needs to be evolved into human-architecture-digit-city-society, where information manage-

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/article/ubiquitous-eco-cities/43583

Related Content

Ubiquitous Connectivity & Work-Related Stress

J. Ramsay, M. Hairand K. V. Renaud (2010). *Ubiquitous and Pervasive Computing: Concepts, Methodologies, Tools, and Applications* (pp. 1315-1330).
www.irma-international.org/chapter/ubiquitous-connectivity-work-related-stress/37852

A Film Criticism Website Based on "ThinkPHP"

Sun Zhiyong, Liu Yeand Chen JiaHui (2017). *International Journal of Advanced Pervasive and Ubiquitous Computing* (pp. 1-22).
www.irma-international.org/article/a-film-criticism-website-based-on-thinkphp/180717

Modeling of Across-Chain Network Dynamic Competition for MNC in Industrial Cluster

Chunling Liu, Jizi Li, Guo Liand Xiaogang Cao (2013). *Global Applications of Pervasive and Ubiquitous Computing* (pp. 236-256).
www.irma-international.org/chapter/modeling-across-chain-network-dynamic/72948

Novel Hybrid Genetic Approach for Two Dimensional Guillotisable Cutting Problems

Hamadi Hasniand Hamza Gharsellaoui (2012). *International Journal of Advanced Pervasive and Ubiquitous Computing* (pp. 1-12).
www.irma-international.org/article/novel-hybrid-genetic-approach-two/73649

Outline of the Human Factor Elements Evident with Pervasive Computers

Genevieve Watsonand Antony Glambedakis (2010). *Ubiquitous and Pervasive Computing: Concepts, Methodologies, Tools, and Applications* (pp. 993-1005).
www.irma-international.org/chapter/outline-human-factor-elements-evident/37832