

A Study on Using U-Service to Strengthen Urban Competitiveness

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ABSTRACT

This study examined correlations between U-Service for U-City and assessment indicators for urban competitiveness. The results of this study show that U-Service is used as a means of strengthening urban competitiveness in six types of cities, despite the differences in degree of contribution. The proper use of U-Service in Safety & Health City and Vitality (Economy) City has significantly contributed to strengthening the competitiveness of such cities. Of the assessment items for urban competitiveness, common items and Culture City type show that U-Service has not contributed much to strengthening urban competitiveness. The analysis shows that because common items are part of the assessment items for urban policies, these items are not suitable to the character of a U-City that implements U-Service through intelligent physical facilities. On the other hand, U-Service related to the Culture City type is relatively less developed. This study found out that U-Service could be used to reinforce urban competitiveness.

Keywords : urban competitiveness, U-Service, U-City

요 약

본 연구에서는 유시티의 U-서비스와 도시경쟁력 평가지표의 상호 연관성을 찾고 있다. 연구결과 U-서비스가 빈도에 차이를 보이지만 6개의 도시유형별로 도시경쟁력 강화 수단으로 활용되고 있다. 특히 안전·건강, 활력(경제)도시형에서 적절한 U-서비스 활용은 도시경쟁력 강화에 기여할 수 있는 빈도가 높다. 다음으로 도시경쟁력 평가항목 중 공동항목과 문화도시형에서는 U-서비스가 도시경쟁력 강화에 상대적 기여도가 낮다. 이는 도시의 정책을 평가하는 항목으로 구성되어 있는 공동항목이 도시의 물리적 시설 지능화를 통해 U-서비스를 구현하는 유시티 성격에 부합되지 않는 것이다. 반면 문화도시형과 관련된 U-서비스는 상대적으로 서비스개발이 미약하기 때문이다. 본 연구를 통해 U-서비스는 도시 경쟁력 강화에 활용될 수 있음을 확인할 수 있었다.

주요어 : 도시경쟁력, U-서비스, 유시티

I. Introduction

1. Background and Purpose of the Study

The word “ubiquitous,” meaning “being present every-

where at once,” has become the new topic of conversation in urban development. Many countries across the world have established strategies for ubiquitous-City or U-City as their national growth engine or means of strengthening urban competitiveness (Lee Sang-ho and three others, 2008).

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If a “paradigm” is defined as the generally accepted perspective or set of dominant theories, thoughts, and values of a particular discipline at a given time, then U-City has become a new paradigm in urban planning.

The Act on Ubiquitous City Construction defines a “U-City” as a city that provides ubiquitous city services (hereinafter referred to as “U-Service”) to strengthen its competitiveness and improve quality of life. A U-City can be a means of strengthening urban competitiveness through the use of U-Service.

There is a saying that the current U-City has the word “ubiquitous” with no city. This is to say that U-City should be built in a manner to have technology and the concept of space in harmony. Other countries have changed their U-City strategies from supplier- and technology-centered to consumer- and space-centered ones. In line with this trend, Korea also has shifted toward consumer- and space-centered U-City strategies (Lee Sang-ho·Jeon Gyeong-il, 2009).

This implies that U-Service for U-City is required to find its availability in urban space rather than in its technological level.

Therefore, this study analyzes the correlation between the definitions of U-Service and assessment indicators for competitiveness, according to the characteristics of cities. The assessment indicators for urban competitiveness are used to evaluate the quality of citizen’s lives according to the spatial features of a city. The analysis of the correlations between the indicators and U-Service will present aspects of spatial use according to the characteristics of U-Service.

2. Scope and Method of the Study

U-Service for U-City is based on the Act on Ubiquitous City Construction, eleven U-Service areas defined in the Guidelines for Ubiquitous City Technology, and 228 element services (Han In-gyo, 2009) classified by the Ubiquitous Ecology City R&D Center. Assessment indicators for urban competitiveness are selected to fully reflect characteristics of cities, considering preceding studies. Based on the analysis of the correlation between the definitions of U-Service and assessment indicators for cities, this

study proposes aspects of the spatial use of U-Service. The results of this study can be used to identify the potential contribution of U-Service to strengthen urban competitiveness.

II. Theoretical Review

1. Changes in Paradigm and U-Service

Since the 1960s when Jane Jacobs recognized the importance of the neighborhood unit, a paradigm for urban planning has evolved toward concepts such as traditional neighborhood development (TND), new urbanism, and urban villages. At the same time, solutions of urban problems have been proposed from various perspectives, including public transportation and environmental issues. At the beginning of the 2000s, the concept of U-City, a combination of information technology and city, has emerged as a new paradigm for urban planning (See <Table 1>).

U-City is designed to resolve existing urban problems, integrate diverse functions of urban spaces and make them intelligent. Through these endeavors, U-City aims to improve the quality of citizen’s lives and strengthen the competitiveness of cities (Ministry of Land, Transport and Maritime Affairs, 2009).

2. The Concept of Urban Competitiveness

Urban competitiveness can be defined from two perspectives: One from an economic & industrial perspective that stresses cities where it is favorable to do business, hence it makes much of the environment of business locations; and the other from the perspective of quality of life that emphasizes cities where it is livable for citizens, hence it values the environment for living, housing, welfare, safety and ecology. Because of the diversity and complexity of cities, the two perspectives cannot be clearly divided. A key condition for urban competitiveness from an economic aspect involves securing talented people, but to attract these people, cities must have conditions for a higher quality of life. One of the best example

Table 1. Changes in urban paradigm and emergence of U-City.

Category	Paradigm	Changes
1960s	Neighborhood unit	Jane Jacobs took interest in the physical environment of neighborhood and emphasized the importance of social interaction
1970s	TND	With increased interest in neighborhood since the 1960s, traditional neighborhood development (TND) for living space emerged
1980s	New urbanism	Based on TND, new urbanism appeared to value the structure of residence blocs and local communities, and paved the way for creating a living space that considers convenience for pedestrians and public transportation.
1990s	Urban village	Urban village emerged as a concept of planning for living space at the level of urban restoration to revive environment-friendly communities.
2000s	U-City	U-City emerged as a concept of urban living space where ubiquitous service is provided in any locations at any time to improve urban competitiveness and quality of life.

Source: Shin Yea-cheol·Koo Ja-hoon. A Study on a Conceptual Model for building Ubiquitous Residential Space in the ubiquitous urban neighborhood, Collection of Presentations at the Seminar of the Urban Design Institute of Korea, 2009. p. 369. Reconstructed.

is that Seattle and Vancouver, where the quality of life is high, are recognized as cities favorable to do business (Ministry of Land, Transport and Maritime Affairs, 2009).

Also, the perspective of time should be considered in defining competitiveness because the environment being assessed can change with the passage of time. The ability to sustain competitiveness amid changes over time can be an important element for competitiveness. In other words, sustainability of cities from the perspective of time plays a pivotal role in urban competitiveness.

3. Preceding Studies

This study aims to find out whether U-Service can be used to strengthen urban competitiveness. For this purpose, it is necessary to review existing studies related to the concept of U-City and preceding studies related to urban competitiveness.

As the concept of U-City began to be introduced in 2000, related studies have emerged, including “A Study on Embodiment of the U-City Vision in Korean Cities” by Yang Jeong-seon and Lee Jin-won (2005), “Comparative Study of the Trends, Philosophy, Vision, and Conceptual Characteristics of U-City Strategies” by Lee Sang-ho and three others (2009), and “Study of the Establishment of U-City Service Standards System and Criteria for Service Classification” by Jeong Gyeong-seok and two others (2009). These studies largely focused on the establishment of the concept of U-City and the direction for building U-City.

Studies related to urban competitiveness include “Study of Measurement Indicators for the Quality of Urban Life” by Kim Byeong-guk (1989) and “A Simulated Evaluation on City’s Competitiveness through Survey with Experts” by Lim Byeong-ho and Lee Jae-woo (2008). Despite the differences in detailed items according to changes over time, these studies are based on similar assessment items, such as quality of life, social welfare, urban environment, and level of development, to propose methods of assessing urban competitiveness or compare cities for assessment. Most of the preceding studies used similar indicators for U-City and urban competitiveness and limitedly reflected the rapidly changing social conditions (Kwon Chang-ki·Chung Hyun-wook·Park Sun-hyung, 2008).

U-City has emerged as an important paradigm in urban planning toward a direction of strengthening urban competitiveness. However, no studies have directly proved yet that U-City can be used to reinforce urban competitiveness. Also, studies related to urban competitiveness have not yet taken U-City as an assessment variable. In this regard, it is significant to examine correlations between assessment indicators for urban competitiveness and U-

Service, which can be the essence of U-City.

III. U-City and Selection & Analysis Methods of Indicators for Urban Competitiveness

1. Emergence of U-City and its Implementation Status

Development of information technology and the multi-functionality of urban space have led to changes in the paradigm for cities. In this process, terms have been coined that feature future cities, including “information city,” “wired city,” “intelligent city,” and “Teletopia.” (Choi

Bong-mum, 2007) Korea also has presented its vision for the future by using terms like Cyber Korea, e-Korea, and u-Korea. The term “ubiquitous” became known to the public in 2002 as the vision for u-Korea began to gain media coverage.

With the active support of the government and the response from public corporations, most local governments nationwide have implemented U-City plans and development projects both directly and indirectly (Ryu Jung-seok, 2007). As of 2009, they are planing or developing u-Cities in about 50 areas across the nation. Based on articles 2 and 4 of the bylaw of the Act on Ubiquitous City Construction (“AUCC”), the Ministry of Land, Transport and Maritime Affairs certified forty four pro-

Table 2. Ubiquitous-City construction projects (As of May 2009).

Local governments	Business districts		Remarks
	Article 4 of the Bylaw (Similar projects implementation plan established)	Article 2 of the Bylaw (Agreement Concluded)	
Seoul City(3)	Eunpyeong New Town, Mapo-gu	Magok	
Busan City(2)	Busan	Busan	
Incheon City(4)	Songdo	Yeongjong, Cheongna, Unbuk	
Daegu City(2)		Innovation City Technopolis	
Daejeon City(1)		Southwest District	
Ulsan City(1)		Innovation City	
Gwangju City(1)	Nam-gu		
Gyeonggi Province(16)	Gwanggyo, Seongnam, Unjeong, Dongtan, Heungdeok, Ansan	Homaesil, Pangyo, Wirye, Sosabeol, Segyo, Sihwa Multi-techno Valley(MTV), Janghyeon okgam, Hangang, Okjeong Hoicheon, Samsung Residential Site Development District	
GangwonProvince(2)	Enterprise City	Innovation City	
Chungbuk Province(2)	Enterprise City	Innovation City	
Chungnam Province(4)	New City for Provincial Office, Administrative City, Yeongi	Baebang Tanjeong	
Gyeongbuk Province(1)		Innovation City	
Gyeongnam Province(2)		Sasong, Innovation City	
Jeonbuk Province(1)		Innovation City	
Jeonnam Province(2)	Yeosu	Innovation City	
Sub-total	17	27	Total: 44

Source: Ministry of Land, Transport and Maritime Affairs, Internal data, May 2009.

Table 3. Service areas of U-City.

Areas	Explanations
Administration	Service that enables easy and fast administration anywhere anytime through a combination of ubiquitous technology and administrative affairs
Transportation	Pedestrian-friendly service through the establishment of systematic and efficient public transportation network and intelligent transportation information network
Health-medical care Welfare	Service that provides welfare for the socially weak as well as medical care and treatment for the public, using ubiquitous technology
Environment	Service that monitors climatic changes in realtime using sensors and offers guidance for delivery of information and warning on environmental changes and ways of handling the changes.
Crime & disaster prevention	Service that identifies crime-prone areas and disaster risks using CCTV, sensors, mobile and other devices, to reduce damages
Facility management	Service that supports integrated management of urban facilities using information collected by RFID, sensors, and GIS
Education	Service that enables high quality education using the realtime features and spatial transcendence of ubiquitous technology unrestricted by time and locations
Culture Tourism·Sports	Service that supports easy access to cultural environment through guidance to cultural events and tourist attractions
Logistics	Service that supports integrated management of the traffic and information of logistics, using RFID technology.
Labor Employment	Service that enables home-based work or online collaboration at the highest efficiency and free from physical locations through improvement of working environment, using information and communications technology.
Others	Service that ensures convenience for users and higher quality of life through the establishment of infrastructure other than the above-mentioned services.

Source: Guidelines for Ubiquitous City Technology, Ministry of Land, Transport and Maritime Affairs, 2009, p. 20

Table 4. element services according to the classification of U-Service.

Category	Administration	Transportation	Health/medical care/welfare	Environment	Crime·disaster prevention	Facility management
element service	15	42	28	19	21	14
Category	Education	Culture/tourism·sports	Logistics	Labor/employment	Others	Total
element service	17	18	20	17	17	228

Source: Han In-gyo, Standardization of U-Service, Presentation at the workshop hosted by U-Eco City R&D Center, LGCNS, March 2009

Table 5. An example of element service and its definition.

Area	element service	Definition of service
Administration	u-Customer service	Distance service that is provided for citizens with their application of various requests and services, public view and issue of documents and the results of administration through the internet, wall pads, TVs, DMBs, mobiles(cellular phone/PDA) and kiosks
	Portal service for local information	Customized service that is provided for residents with local information based on administrative and locational information in the community.

Source: Han In-gyo, Standardization of U-Service, Presentation at the workshop hosted by U-Eco City R&D Center, LGCNS, March 2009

ject districts (as of May 2009) as “ubiquitous-city construction projects” for thirty one local governments (See <Table 2>).

2. Current U-Service Areas

U-Service refers to services that are provided through the collection and combination of information according to the main functions of cities, including administration, transportation, welfare, environment, and disaster prevention. U-Service consists of 11 areas in total as shown in <Table 3>.

A survey of cities currently implementing U-City shows that they provide a total of 228 element services according to the classification of 11 service areas (See <Table 4>). element services, as defined in <Table 5>, help citizens directly experience U-City. In general, U-Service can be understood as a combination of activities that economic actors, including individuals, businesses, and the government, can be provided with intelligent information and content in any locations and at any time using ubiquitous technology and infrastructure (Jeong Keong-seok·Moon Tae-heon·Heo Sun-young, 2009). This implies that through the use of U-Service, urban problems can be resolved and competitiveness promoted.

3. Assessment Indicators for Urban Competitiveness

1) Selection of Assessment Indicators for Urban Competitiveness

Because the concept of urban competitiveness is defined from comprehensive perspectives, urban competitiveness can vary greatly according to the components that determine the concept of urban competitiveness (Jang Hyo-cheon, 2007).

This also shows that all cities are different in character and components. Therefore, an assessment of competitiveness based on a single indicator may confine the evaluation of the competitiveness of a city to that indicator alone. As shown in the classification of U-Service, there are 228 element services classified according to eleven service areas. U-Service influences citizens in the form of element service because of its relation to various urban assessment indicators.

Given all that is discussed above, to analyze the correlation between U-Service and urban competitiveness, it is necessary to have indicators that enable a comprehensive assessment of urban competitiveness. As shown in <Table 6>, there are many assessment indicators, including

Table 6. Comparison of assessment indicators for urban competitiveness.

Category	Grand Prize for Building Livable Cities (Ministry of Land, Transport and Maritime Affairs)	Green City (Ministry of Environment)	Business-friendly Region (Ministry of Knowledge Economy)
Goals	Suggesting directions for desirable urban planning and management	Promoting environmental management ability and environment-friendly local administration	Selecting business-friendly region and creating favorable environment for business
Assesseees	Combined assessment of candidate cities, counties, and districts	Separate assessment of candidate cities, counties and districts by city, county, and district	Cities with population over 200,000, counties with population over 60,000
Award for Service	Awards for six service areas: Vitality City Award, Culture City Award, Environment City Award, Green Transportation City Award, Safety & Health City Award, Education & Science City Award	Environment-based: Five areas, including natural ecology management Environmental policy: Environmental policy/ administrative determination and performance	Five areas: industrial base, location, workforce, support, innovation conditions

Source: Ministry of Land, Transport and Maritime Affairs, Study of Plan on Building Urban Assessment System and Service for Building the System, 2007, p. 119.

“Green City” and “Business-friendly Region.” Of them, this study used “Grand Prize for Building Livable Cities” because of its comprehensive nature (Ministry of Land, Transport and Maritime Affairs, 2007b).

2) Assessment Indicators for Grand Prize for Building Livable Cities

Assessment Indicators for Grand Prize for Building Livable Cities are largely divided into common and individual items. Assessment for individual items includes six types of cities, such as Vitality (Economy), Culture, Environment, Green Transportation, Safety & Health, Education & Science City. Assessment for common items includes strategies for business-related specialized development, citizen participation and community collaboration, feasibility, and expected effects. Considering these common items, six grand prizes in total are awarded, one each to the city selected for an individual item.

Table 7. Assessment items for “Grand Prize for Building Livable Cities” .

Category		Assessment items
Common items		Business-related specialized development strategy, citizen participation and community collaboration, feasibility, expected effects
Individual items	Vitality City Type	Agro-economy type, industrial economy type, business service type, tourism & leisure type
	Culture City Type	Architectural culture type, history & culture type, Arts & culture type, Urban landscape type
	Environment City Type	Eco-environment type, natural landscape type, energy-saving and creation type
	Green Transportation City Type	Public transportation type, pedestrian & bicycle transportation type
	Safety & Health City Type	Health city type, disaster prevention & safety Type, urban improvement type
	Education & Science City Type	Educational learning type, information science type

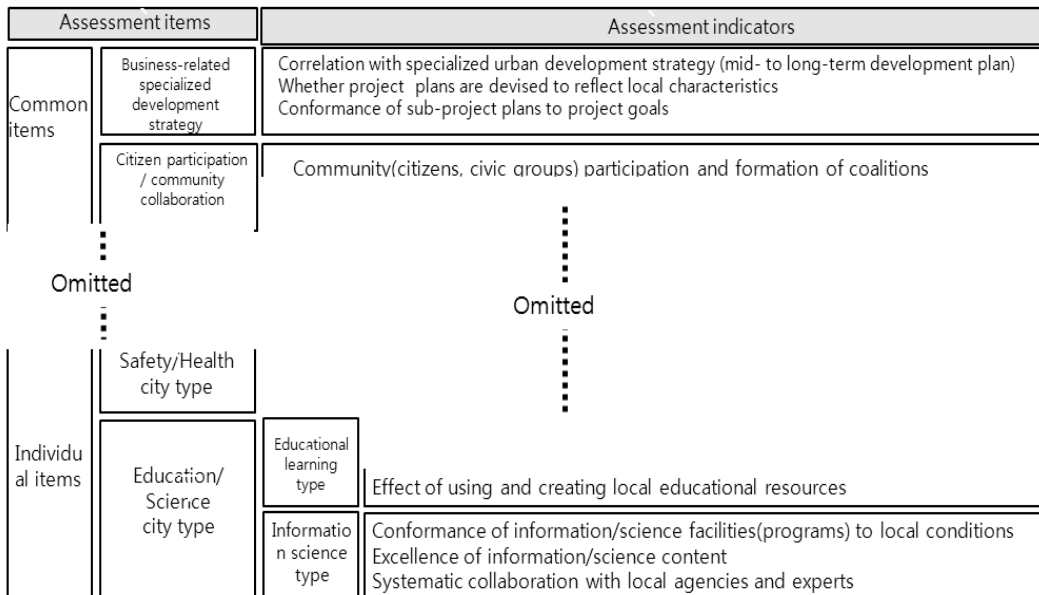


Figure 1. Examples of composing assessment indicators

IV. Analysis of the Correlations between U-Service and Urban Competitiveness

1. Setting & Analyzing Items for U-Service Analysis

Because this study aims to find out whether U-Service has correlations to urban competitiveness, items beyond the scope of service application are excluded from the analysis of element services. Eight element services are excluded from the transportation category because they are either beyond the spatial scope of cities such as wide-area transportation or simple improvement services of vehicle functions that are only slightly related to functional

changes of cities (See <Table 8>).

An analysis was made to find out the correlations by examining whether element service definitions of U-City are appropriate for assessment indicators. In this method, the correlations between 220 element services and 65 assessment items were analyzed as shown in (Fig. 2). This analysis used 220 element services, excluding 8 from 228 element services of U-City.

2. U-Service and Analysis of Common Items

The analysis of this study shows that among the 4 common items, 4 element services in the category of “citizen participation and community collaboration” act as

Table 8. U-Service excluded from the analysis.

Category	Name of element service	Reason for exclusion	Remarks
Transportation	· Freeway traffic flow control service	· Service beyond the spatial scope of cities	2
	· Wide-area traffic flow control service		
	· Longitudinal vehicle collisions prevention service	· Simple improvement service for vehicle functions	6
	· Lateral vehicle collisions prevention service		
	· Automated vehicle safety checking service		
	· Clockwise service for drivers		
	· Vehicle interval control service		
	· Vehicle platoon cruising service		

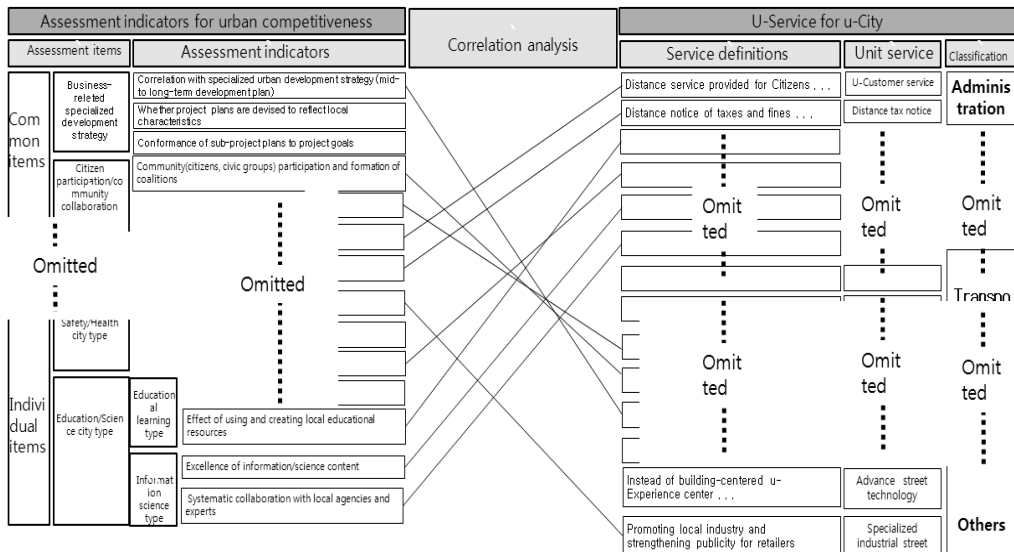


Figure 2. Method of correlation analysis

Table 9. Analysis result of the correlation between common items and U-Service.

Category	U-Service classification		Sub-total
	Administration	Others	
Business-related Specialized development strategy	-	-	-
citizen participation and Community Collaboration	3	1	4
Feasibility	-	-	-
Expected effects	-	-	-
Sub-total	3(20%)	1(5.9%)	4(1.8%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

Table 10. Analysis result of the correlation between Vitality City Type and U-Service.

Category	U-Service classification					Sub-total
	transportation	Culture/tourism/sports	Logistics	Labor/employment	Others	
Agro-economy type	-	-	4	-	-	4
Industrial economy type	-	-	11	2	-	13
Business service type	-	1	5	15	1	22
Tourism/leisure type	1	10	-	-	-	11
Sub-total	1 (2.9%)	11 (61.0%)	20 (100%)	17 (100%)	1 (5.9%)	50 (22.7%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

positive factors for assessment indicators. This figure of 4 element services accounts for 1.8 percent of the total 220 element services used in the analysis. This figure consists of 3 from administration and 1 from the others category in the classification of U-Service.

As shown in <Table 9>, common items have a strong policy character. In other words, U-Services related to common items are functional element services that enable citizens to participate in the policy-making process. The four element services currently being implemented consist of U-Services that facilitate citizens' participation in public hearings or application of requests to government agencies.

3. U-Service and Analysis of Individual Items

1) Vitality City Type

“Vitality City Type” assesses cases of implementing leading or exemplary projects that can be differentiated from other cities in the economic and industrial category (Ministry of Land, Transport and Maritime Affairs, 2007a).

The analysis of this study shows that 50 element services, accounting for 22.7 percent of the 220 element services used, work as positive factors for assessment indicators. Of 11 classified U-Services, all 20 element services for logistics and all 17 element services for labor & employment are related to assessment indicators for the Vitality City Type. Of the 18 element services in the category of culture & tourism & sports, 11 element services have an impact on assessment indicators for the Vitality City Type (See <Table 10>).

2) Culture City Type

“Culture City type” assesses cases of planning and implementing U-City with a goal of developing culturally specialized cities (Ministry of Land, Transport and Maritime Affairs, 2007a).

There are 12 element services that affect the Culture City type, and of this number, 9 element services are concentrated in the urban landscape type. On the other

Table 11. Analysis result of the correlation between Culture City type and U-Service.

Category	U-Service classification				Sub-total
	Administration	Facility management	Culture tourism & sports	Others	
Architectural Culture type	-	-	-	-	-
Historic Culture type	-	-	2	-	2
Artistic Culture type	-	-	1	-	1
Urban landscape type	3	1	2	3	9
Sub-total	3 (20%)	1 (7.1%)	5 (27.8%)	3 (17.7%)	12 (5.5%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

Table 12. Analysis result of the correlation between Environment City type and U-Service.

Category	U-Service classification	Sub-total
	Environment	
Eco-environment type	7	7
Natural landscape type	-	-
Energy saving & creation type	7	7
Sub-total	14 (73.7%)	14 (6.4%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

hand, there are no U-Services related to the architectural culture type. The analysis shows that of the total 11 classified U-Services, administration, facility management, culture & tourism & sports, and other services are related to this type of city (See <Table 11>).

3) Environment City Type

“Environment City type” assesses cases of planning and implementing U-City with a goal of developing environmentally specialized cities, including industrial development that contributes to the preservation, restoration, and creation of natural ecology in the cities; to the establishment of facilities for environmental preservation; and to environmental conservation (Ministry of Land, Transport and Maritime Affairs, 2007a).

The analysis of this study shows that of the classified U-Services, 14 environment-related element services, accounting for 73.7 percent of the total element services, are related to Environment City type. But it is notable that there are no U-Services related to the natural landscape type (See <Table 12>).

4) Green Transportation City Type

“Green Transportation City type” assesses cases of promoting green transportation such as walking and bike-riding, increasing convenience for pedestrians (weak pedestrians), effectively introducing and using environment-friendly public transportation (Ministry of Land, Transport and Maritime Affairs, 2007a).

Green Transportation types can be classified into the public transportation type and the pedestrian & bicycle type. There are 30 element services that are related to the Green Transportation type and remarkably, 28 element services, accounting for 93.3 percent of the 30 sub-total element services, are concentrated in the public transportation type. According to the classification of U-Services, 24 element services are related to the transportation category, accounting for 80 percent of the 30 sub-total element services. Health & medical care & welfare, environment, crime & disaster prevention, and facility management element services are also partially related to this type of city (See <Table 13>).

5) Safety & Health City Type

“Safety & Health City type” assesses cases of plann-

Table 13. Analysis result of the correlation between Green City type and U-Service.

Category	U-Service classification					Sub-total
	transportation	Health /medical care /welfare	Environment	Crime and Disaster prevention	Facility management	
Public transportation type	23	2	-	2	1	28
Pedestrian/ Bicycle type	1	-	1	-	-	2
Sub-total	24 (70.6%)	2 (7.1%)	1 (5.3%)	2 (9.5%)	1 (7.1%)	30 (13.6%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

ing and implementing U-City with a goal of developing safety- and health-centered cities to promote safety, disaster prevention, and health (Ministry of Land, Transport and Maritime Affairs, 2007a).

Of the 11 classified U-Services, 8 U-Services are more or less related to Safety & Health City type. It should be noted that of 8 U-Services, the proportions of the element services for health & medical care & welfare and for crime and disaster prevention are relatively high. Of the total 220 element services of U-Service, 64 element services, almost 30 percent, are related to this type of cities (See <Table 14>).

6) Education & Science City Type

“Education & Science City type” assesses cases of selecting themes from the education or science area and planning and implementing projects according to the selected themes; or aiming to develop cities through industrial deve-

Table 14. Analysis result of the correlation between Safety & Health City type and U-Service.

Category	U-Service classification								Sub-total
	transportation	Health /medical care/welfare	Environment	Crime/ disaster prevention	Facility management	Education	Culture tourism sports	Others	
Health City type	1	26	-	-	-	-	1	-	28
Disaster prevention/ safety type	-	-	-	19	9	1	-	2	31
Urban improvement type	-	-	4	-	-	-	-	1	5
Sub-total	1 (2.9%)	26 (92.9%)	4 (21.0%)	19 (90.5%)	9 (64.4%)	1 (5.9%)	1 (5.6%)	3 (17.7%)	64 (29.1%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

Table 15. Analysis result of the correlation between Education & Science City type and U-Service.

Category	U-Service classification						Total
	administration	transportation	Facility management	Education	Culture tourism sports	Others	
Educational learning type	-	-	-	16	1	-	17
Information Science type	9	8	3	-	-	9	29
Sub-total	9 (60%)	8 (23.6%)	3 (21.4%)	16 (94.1%)	1 (5.6%)	9 (52.8%)	46 (20.9%)

Notes) 1. The figures of U-Service classification are the number of element services used in the analysis.
 2. The proportions of sub-total are the ratio of the number of element services to the total 220 element services used in the analysis.

development of education or science (Ministry of Land, Transport and Maritime Affairs, 2007a).

Education & Science City type has two categories for assessment, educational learning type and information & science type. U-Services for this type of city, largely classified into education and other services, have correlations with assessment indicators. The element services of U-Service related to educational learning type total 17, of which 16 are related to the education category. On the other hand, the element services of U-Service related to information & science type equal 8 to 9 for administration, transportation, and other services respectively and 3 for facility management (See <Table 15>).

4. Summary of Analysis

This study conducted a comparative analysis of correlations between U-Service and assessment indicators for urban competitiveness assessment items. The analysis showed that the definitions of U-Service and assessment indicators for urban competitiveness assessment items have high or low correlations with each other (See <Table 16>).

First, the analysis shows high correlations between U-Services and types of Safety & Health, Vitality, and Education & Science Cities in that order. Safety & Health and Education & Science City types have correlations with element services of various U-Services. On

Table 16. Summary of Analysis Results.

Category		Assessment items							Total
		Common	Vitality	Culture	Environment	Green transportation	safety Health	Education Science	
U-Service classification	administration	3 (20%)	-	3 (20%)	-	-	-	9 (60%)	15 (100%)
	transportation	-	1 (2.9%)	-	-	24 (70.6%)	1 (2.9%)	8 (23.6%)	34 (100%)
	Health, medical care welfare	-	-	-	-	2 (7.1%)	26 (92.9%)	-	28 (100%)
	Environment	-	-	-	14 (73.7%)	1 (5.3%)	4 (21.0%)	-	19 (100%)
	Crime/disaster prevention	-	-	-	-	2 (9.5%)	19 (90.5%)	-	21 (100%)
	Facility management	-	-	1 (7.1%)	-	1 (7.1%)	9 (64.4%)	3 (21.4%)	14 (100%)
	Education	-	-	-	-	-	1 (5.9%)	16 (94.1%)	17 (100%)
	Culture tourism sports	-	11 (61.0%)	5 (27.8%)	-	-	1 (5.6%)	1 (5.6%)	18 (100%)
	Logistics	-	20 (100%)	-	-	-	-	-	20 (100%)
	labor employment	-	17 (100%)	-	-	-	-	-	17 (100%)
	Others	1 (5.9%)	1 (5.9%)	3 (17.7%)	-	-	3 (17.7%)	9 (52.8%)	17 (100%)
	Total	4 (1.8%)	50 (22.7%)	12 (5.5%)	14 (6.4%)	30 (13.6%)	64 (29.1%)	46 (20.9%)	220 (100%)
Ranking	7	2	6	5	4	1	3		

Note) Boxes are shaded where the correlations between each element service and assessment items are over 50%.

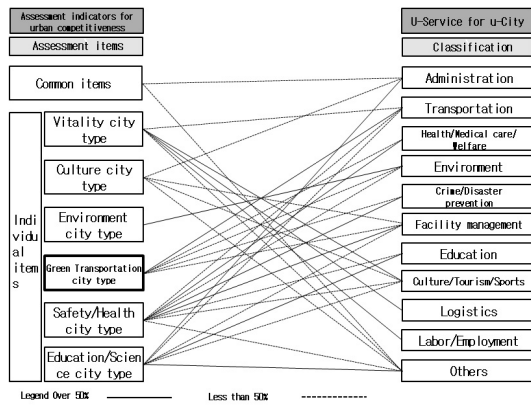


Figure 3. Summary of Analysis Results

the other hand, the items for the Vitality City type depend on the particular U-Services.

Second, the analysis shows that among the assessment items, there are not many element services of U-Services that have correlations with Culture City type. Nor are the items concentrated in the particular U-Services.

Third, assessment items for the Environment City type, 14 element services, 73.7 percent of the 19 element services for environment show correlations. This indicates that for Environment City type, only element services of U-Service in the category of environment act as positive factors for improving urban competitiveness.

The summary of analysis is as shown in (Fig. 3) and <Table 16> with boxes shaded where the correlations for each element service, according to the classification of U-Service, are over 50 percent.

V. Conclusion

This study analyzed the correlations between U-Service and assessment indicators for urban competitiveness. For this analysis, the study used assessment Building Livable Cities” which represent assessment indicators for urban competitiveness. This study is significant in that the indicators show specifically what U-Service can contribute to strengthening competitiveness in which category of city.

The results of this study show that U-Service is used as a means of strengthening urban competitiveness in six types of cities, despite the differences in degree of contribution. The proper use of U-Service in Safety & Health and Vitality (Economy) City types has significantly contributed to strengthening competitiveness of such cities. In common items among assessment items for urban competitiveness and Culture City type, U-Service has not contributed much to strengthening urban competitiveness. The analysis shows that because common items are part of the assessment items for urban policies, they are not suitable to the character of a U-City that implements U-Services through intelligent physical facilities. It is also analyzed that U-Service related to Culture City type is relatively less developed. It is interpreted that these findings should be considered in further developing U-Service.

In conclusion, this study found that U-Service can be used to reinforce urban competitiveness and element services of U-Service can be used differently according to the type of city. But U-Service will further contribute to strengthening urban competitiveness when sufficient consideration is given to existing urban infrastructure and issues because U-Service for U-City is provided through intelligent urban infrastructure.

In future studies, we will assess the degree of contribution of U-Service to urban competitiveness through specific cities.

Acknowledgement

This research was supported by a grant (07High Tech A01) from High tech Urban Development Program funded by Ministry of Land, Transportation and Maritime Affairs of Korean government.

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Received	(November	19, 2009)
Revised	(December	23, 2009)
Accepted	(December	23, 2009)