

DEVELOPING U-CITY MARKET SCENARIOS THROUGH A SCENARIO PLANNING APPROACH

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Abstract

The u-City construction project has become a hot topic in the construction market because it seems economic value-added field for construction firms. However, construction firms don't willingly participate in the u-City construction market because environments of the future business for the u-City are very uncertain. Scenario planning is a very powerful method in managing this uncertain planning situation and is based on scenarios that help each enterprise appropriately adapt itself to its own business environments. Therefore it is based on the main principles of systems thinking and multiple futures. For the purpose of dealing with such uncertainties, this paper attempts to develop the possible market scenarios of the u-City construction market in S.Korea through a scenario planning approach. From this perspective, we considered various aspects of the u-City construction such as market demands, technology development, policy level and management environment. After considering the relevant issues, we identified the main trends and key uncertainties. Finally, we developed three coherent u-City construction market scenarios. Construction firms can use these scenarios as a basic reference for market analysis and business strategy. Therefore, this paper is able to enhance the participation of construction firms in the u-City construction market.

Keywords: u-City, Scenario Planning Approach, Uncertainty

1. Introduction

With up-to-date information-communication infrastructure, the u-City means a spearhead city, which improves life quality and convenience of the citizens in order to execute a role of the next generation's new industry.

In this context, the u-City is already being competitively constructed from various nations to improve city's competitive power. In S.Korea, the u-City construction project is selected as an important subject of VC-10 plan of the Ministry of Construction and Transportation. And also, until 2006 May, 28 local-self governments have announced the enforcement of the u-City.

Moreover, the fusion of IT and construction industry will create a synergic effect because IT and construction industry each takes 14, 17% of national GDP. Therefore, the u-City is able to enhance national economy and comes into the spotlight as a new export strategic item.

Consequently, in S.Korea, the Ministry of Construction and Transportation has analyzed the market size of the u-City construction project and ties up an u-City business agreement(MOU) with Ministry of Information and Communication in 2006 February. At this point in time, they are in the process of discussing the u-City construction support law. However, it does not present an actual vision because of local-self government's uniform u-City and a poor excuse for the u-City. Accordingly, the doubt is proposed in the u-City developmental possibility which is presented by government. Moreover, it is difficult for construction enterprises to predict the future change of circumstances such as the market, technique, policy, and management. In association with the u-City construction project, it operates as an uncertainty of future enterprise environment. Especially, construction enterprises don't participate in the u-City construction market willingly because IT industry has the initiative of the u-City construction market and lead R&D related to the u-City construction project.

Therefore, using scenario planning approach, which is applied to strategy establishing method under the management circumstance which is uncertain, this thesis will observe the proposed focus issues about the u-City construction project, and analyze influence factors on the market, technique, policy, and management. Then, develop coherent u-City construction market scenarios. Consequently, this research could be applied to fundamental data of the market analysis, and could be possible to enhance the participation of construction enterprises in the u-City construction market.

This paper aims to draw up very uncertain u-City construction market scenarios.

The data, which is carried out inside and outside of S.Korea research and business facilities, has been used to conceptually investigate about the u-City construction and market circumstance. And scenario planning approach has been used to develop the u-City construction market scenarios and strategic direction.

2. Literature review

2.1 The u-City construction project

2.1.1 Concept and necessity of the u-City construction project

With the fusion of ubiquitous service with city space, the u-city is an up-to-date city which improves resident's life quality and value of area through renovation of the various function of the city.

Through these features, the u-City provides city residents with comfortable life, city administrator with convenience which leads the efficiency of city operation. Therefore, the u-City, as the development model for a national balanced development, will activate development of the updated technology and accomplish the quality improvement of the citizen's life through formation of the circulation structure which is composed of initial market formation, research and consumption.

Especially, for a construction industry, the u-City will bring an absurd added value because it can create 3 new markets in concordance with the value chain which includes site development → construction → moving in.

2.1.2 Propulsion trends of the inside-and-outside of S.Korea

In case of foreign countries, the concept of the u-City is deficient so it is propelled with the Digital City. Representative propulsion instances are CyberPort in Hong Kong, One North in Singapore, MSC in Malaysia, Crossroads in Denmark, Technology and Media Free Zone in Dubai. When arranging each national overseas instances, each of them accomplishes construction of the effective network and information-newcity which leads inductions of the frontier industries and synergistic effect of the connected industry using properties of area and IT technologies.

In case of S.Korea, it goes over a dimension of inductions of the frontier industries and synergistic effect of the connected industry, new cities embodying actual ubiquitous services are in the process of advancing.

2.2 Scenario Planning

Uncertainty is the most prominent character of the future business. Generally, uncertainty of the external circumstance occurs when information about the circumstance which besieges the enterprise is not sufficient or external change is difficult to be forecasted. The preference of the customer may change, technologies and regulations may change in concordance with market circumstance, rival companies may attempt a renovation, and the market may be saturated or atrophied.

In this context, the status which is full of uncertainty, scenario planning is a formative methodology which predicts and rediscovers hereafter management circumstance more creatively. In other words, under the future situation which is uncertain, enterprises can establish and practice the strategy through analysis about environmental factor which is possible to happen and construction of convincing scenario.

From practical application side, scenario planning can be used to analyze a new chance through strategic thinking under uncertain management circumstance.

Each deduced scenarios must show each other different explanations and suggestions about future structure, trend and outcome because they inhere generic character as a different counterproposal.

Scenario planning process is various in concordance with application object or purpose. But, it is normally composed of 5 phases as a strategic tool. This study adopted a method and flow like Figure 1.

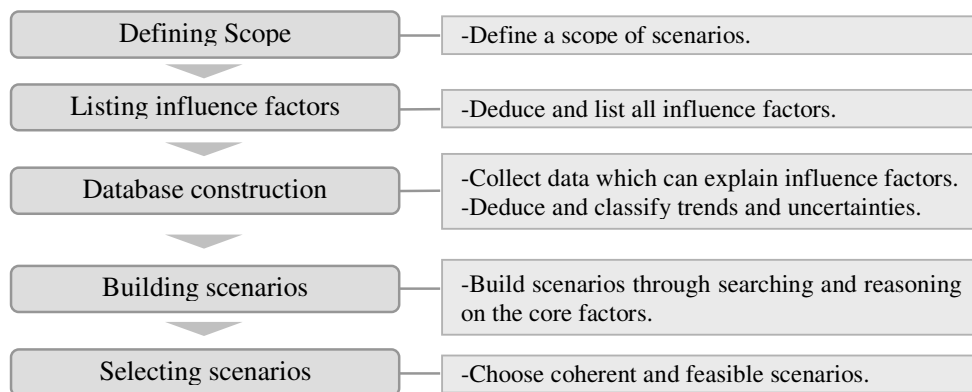


Figure 1. The procedures and contents of the scenario planning approach

3. Scenarios of the u-City construction market

3.1 Phase 1 : Define the decision-making scope

In the first phase of the scenario planning, it defines decision-making items which are ultimate objectives of scenario analysis such as final decision-making items, scope and duration. Therefore, in this research, three key issues of the future u-City scenarios are deduced through collecting related documents and investigating these documents.

Three key issues are:

- 1) What kind of business opportunities will be focused on?
- 2) What kind of methods will be propelled?
- 3) When is the appropriate investment point?

3.2 Phase 2 : Deduce decision-making influence factors

In the second phase, micro and macro factors which influence key issues are listed. To observe key issues more closely, each issues is defined as 3~5 decision fields and influence factors, which effect to each fields, are deduced.

In this research, the u-City construction's influence factors are applied to CIC consideration matters which are presented at Betts' and Jung&Gibson's research. Jung and Gibson have suggested market strategy, management, information integration and technology as CIC consideration matters. And Betts has suggested political factor of national view point.

Therefore, in this research, the u-City construction's decision fields are defined 4 fields: market demands, technology development, policy level, management environment.

Thirteen influence factors in 4 fields are deduced through interviewing experts and investigating documents. These are listed in Table 1.

Table 1. Influence factors

Decision Fields	Influence Factors
Market Demands	<ul style="list-style-type: none"> ◦ Growth possibility of the u-City construction market (e1) ◦ Market size of the ubiquitous business (e2) ◦ Market size of the u-City construction and Timing of activation (e3) ◦ Main group of business (e4)
Technology Development	<ul style="list-style-type: none"> ◦ Developmental speed of the ubiquitous technology (e5) ◦ Connected characteristic with new-tech and existing-tech (e6) ◦ Compatibility and Maturity of technology (e7)
Policy Level	<ul style="list-style-type: none"> ◦ Possibility of the political support (e8) ◦ Connection with other policies (e9) ◦ Political support level of the business owner (e10)
Management Environment	<ul style="list-style-type: none"> ◦ Business structure (e11) ◦ Profit model (e12) ◦ Change of the u-city construction competition (e13)

3.3 Phase 3 : Compose data through external environment analysis

In the third phase, the external environment, which is related to decision-making, is

analyzed. Therefore, in this phase, deduced influence factors' past, current, future movements are predicted through systematic documents analysis and expert interview. At this time, foreseeable factors are sorted as trends and unforeseeable factors are sorted as uncertainties. Therefore, trends are defined as definite statements and uncertainties are defined as questions(Shoemaker, 2002:54).

In this research, to analyze external environment of the u-City construction, questionnaire survey had been executed in concordance with uncertainty and influence level to 30 persons in charge who work currently in the u-City taskforce team.

Table 2. Structure of the questionnaire survey

Category		Uncertainty(U)					Future influence(I)						
		Low → High					Min → Max						
		1	2	3	4	5	A	B	C	D	E		
Market Demands	Growth possibility of the u-City construction market	e1											
	Market size of the ubiquitous business	e2											
	Market size of the u-City construction and Timing of activation	e3											
	Main group of business	e4											
Technology Development	Developmental speed of the ubiquitous technology	e5											
	Connected characteristic with new-tech and existing-tech	e6											
	Compatibility and Maturity of technology	e7											
Policy Level	Possibility of the political support	e8											
	Connection with other policies	e9											
	Political support level of business owner	e10											
Management Environment	Business structure	e11											
	Profit model	e12											
	Change of the u-city construction competition	e13											

The scenario planning matrix(Figure 2.) is prepared in concordance with question result. It leads to classify key uncertainties and important trends.

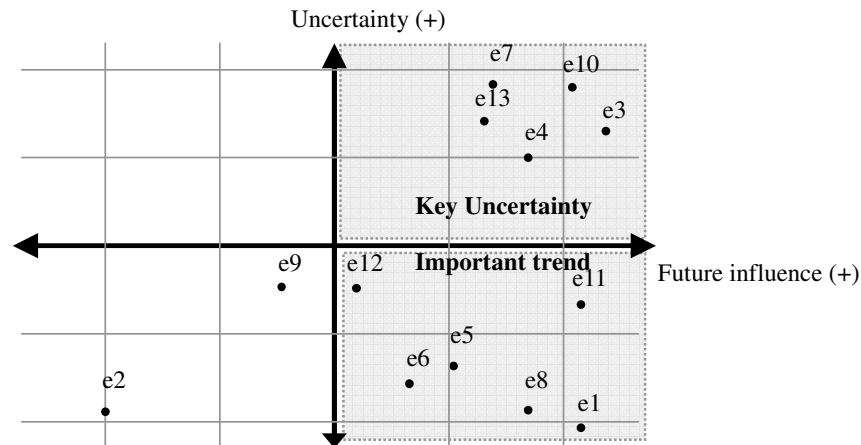


Figure 2. Scenario Planning Matrix

With this method, deduced important trends of the u-City construction are listed in table 3.

- From market demands side, the size of the u-City construction market will grow progressively considering overseas trends and a market data(T1).
- From technology development side, ubiquitous technology based on IT will develop sharply due to rapid increase in general demands(T2), and will have a connection with new tech such as Wibro and existing tech such as wireless LAN(T3).
- From Policy Level side, the u-City construction support law will be introduced until 2007(T4).
- From management environment side, the construction enterprises weak in IT technology will strategically cooperate with each other(T5). Due to the u-City's characteristic which demands multi field technology, enterprises will participate in the market with consortium form(T5-1). And various profit models will arise(T6).

Table 3. Important trends of the u-City construction market

Category		Important Trends
Market Demands	T1	The size of the u-City construction market will grow progressively. (e1)
Technology Development	T2	Ubiquitous technology will develop sharply due to rapid increase in general demands. (e5)
	T3	Ubiquitous technology will have a connection with new tech and existing tech. (e6)
Policy Level	T4	The u-City construction support law will be introduced. (e8)
Management Environment	T5	The construction enterprises weak in IT technology will strategically cooperate with each other. (e11)
	T5-1	Enterprises will participate in the market with consortium form. (e11)
	T6	Various profit models will arise. (e12)

The other side, the following are selected as key uncertainties of the u-City construction.

- First, political support level of the government is. In S.Korea, government has positive drive of the u-City considering the u-City as an u-Korea basic plan's 5 superior fields. Moreover, the Ministry of Construction and Transportation regards the u-City as topic of the ubiquitous related construction and selects it as prior business subject and contracts with the ministry of Information and Communication at u-City business agreement. However, due to opposition of relationship (especially IT business and construction business) of gain and loss, it is difficult to mediate among multiple concerned business. In this circumstance, it is uncertain how political support of the government will be.
- Second, main group of business is. Construction circle is requested to reinforce their role in the u-City construction market. Because IT circle have a responsibility of problems in initial process of the u-City construction. However, IT industry already has the initiative and lead R&D related to the u-City construction project. In this circumstance, it is also uncertain who will be main group of the u-City.

- Third, development level of technology is. In S.Korea, various academic circle, industrial circle and research institutions continuously invest in research and development to preoccupy the international standard and market. However, the problem of technology maturity, which means applicable in concordance with the development schedule, is continuously presented.
- Fourth, size of the u-City construction market is. The u-City has upward tendencies because government has a strong will and demands are so high. However, only optimistic view of the market is not appropriate because not only preparation plan of the development cost but also induction of the civil participation is not sufficient.
- Fifth, competition composition of the u-City is. Recently, many medium and large-sized construction enterprises and venture enterprises in IT industry have been cooperating and participating in the u-City construction market. However, a small number of enterprises' power of the influence is excessively high through integrated ability of the group. In this circumstance, it is also uncertain how competition composition of the u-City construction will go and how many enterprises will come into action in market.

With this method, deduced key uncertainties of the u-City construction are listed in table 4.

Table 4. Key uncertainties of the u-City construction market

Category	Key uncertainty
U1	How will political support of the government change? (e10)
U2	Who will be a main group of the u-City? (e4)
U3	Is technological development sufficient to demands of the u-City construction? (e7)
U4	How large will the size of the u-City market expand? (e3)
U5	How will competition composition of the u-City change? (e13)

3.4 Phase 4 : Construct Scenarios

This phase is a heart phase of a scenario planning and a phase of construction of the scenario. In this research, morphological method, which constructs scenario through outlining all issues and influence factors to shape blueprint, is used.

Morphological method

- 1) deduct influence factors that affect future,
- 2) define deducted factors as key questions,
- 3) search each question's alternative plan,
- 4) combine an alternative plan and analyze coherent, feasible scenarios.

In morphological method for construction of scenarios, the first key question is government's political support level(Q1).

Q1-a) The civil investment may be magnified, and fair competition may be promoted by various administrative and economic systematization.

Q1-b) It may be failed to establish integrated policies of central government because of disordered local-self government's plan of the u-City.

Q1-c) The government may draft a bill which is advantageous only to designated industries or may minimize the political support level.

The second key question is main group of the u-City construction project(Q2).

Q2-a) The construction industries may play the trigger role in u-City and present the u-City model and require related industries to develop technologies.

Q2-b) The u-City construction project may be in progress with IT industry-centered consortium and the construction industry may decline as subcontractors who construct only the frame of the u-City.

The third key question is the technological development level(Q3).

This question is related to mutual operation, suitability and flexibility.

Q3-a) Technologies, which is required and induced by construction industry, may secure mutual operation, suitability and flexibility.

Q3-b) Ubiquitous systematic technologies and construction technologies may sharply develop but fusion technologies may develop tardily.

Q3-c) The suitability and flexibility of the technologies may not be secured because of the characteristic of IT which has quick developmental speed of technologies, and construction which has a long period of development.

The fourth key question is the size of the u-City market(Q4).

Q4-a) In S.Korea, the yearly mean of the u-City market expansion may maintain 15%.

Q4-b) In case, an exhibition phase which is prearranged between 2007 and 2008 cannot have good results as expected, the rate of the growth may slow down.

Q4-c) Due to lack of the expense plan and civil-participation plan, the u-City construction market may have immaterial increase.

The fifth key question is competition composition of the u-City(Q5).

Q5-a) Various medium and large-sized construction enterprises may cooperate with IT venture enterprises in order to participate in the u-City market. And the market may be operated by fair means of competition.

Q5-b) With effective market defense of the existing business owner and pursuit of the late start runner in consortium, there may be not a big difference with current market.

Q5-c) Initially, various business owners may participate in market. But finally, existing powerful business owners may monopolize the market.

3.5 Phase 5 : Select scenarios

Combining all key uncertainties, the number of scenarios is 2×35 , namely 486.

However, by interviewing with expert, coherent scenarios are selected as 3 cases which reflect correlation among the uncertainties. Morphological analysis for construction of the u-City scenarios is shown at Figure 3.

(1) Scenario A: Developmental scenario

(2) Scenario B: Status quo scenario

(3) Scenario C: Pessimistic scenario

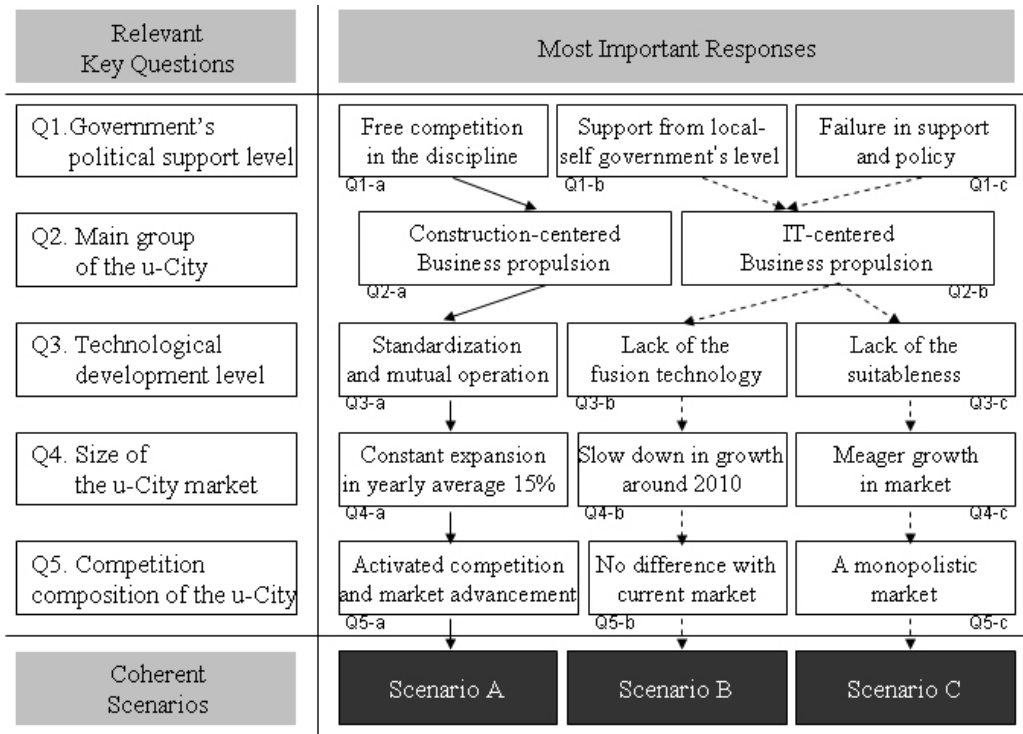


Figure 3. Morphological analysis for construction of the u-City scenarios

4. Conclusion

In this research, using scenario planning approach, which is used to set up strategy in uncertain environment, the u-City construction market scenarios are developed. The research is summarized as follows:

- In methodological view, this research is executed consequently in scenario process. In phase 1, key issues related to u-City construction market are defined and important influence factors are deduced. In phase 2, using questionnaire survey, important trends and key uncertainties are deduced. In phase 3, using morphological method, which is intended to compound possible alternative plans, scenarios are constructed.
- The u-City construction market scenarios are developed as follows. The scenario A is developmental scenario in construction industry's view, and scenario B is the status quo scenario, and scenario B is pessimistic scenario.

Therefore, construction firms can use this thesis as a basic data for market analysis and business strategy. Finally, this thesis is possible to enhance the participation of construction firms in the u-City construction market. Hereafter, on the basis of the proposed scenarios, the business strategies of potential construction firms in the u-City construction market will have to be formulated.

5. Acknowledgment

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