

A Model of Risk Management Plan in the Development Phase of Urban Regeneration Project

Seon-Gyoo Kim

Division of Architecture, Kangwon National University, Chuncheon, Korea

Abstract

Recently, intensive urban redevelopment concentrated on new towns has reduced the number of settled population, and weakened various functions such as commercial, culture, education and welfare in old towns, and made the stagnation and declination of the entire or some parts of old towns. Urban regeneration project means renewing cities' functions in terms of physical, environmental, social, cultural, industrial and economic aspects or revitalizing the existing functions through improvement project in the entire or part of a city, which is now drawing keen attention from the public. However, urban regeneration project is huge in scale, needs long construction period and various complex facilities, and also characterized by complicated relations with many stakeholders. Due to such characteristics, there are many risks in the project. Therefore, systematic risk management is absolutely necessary to efficiently manage various risk factors inherent in urban regeneration project. The purpose of this research proposes a basic model to establish risk management plan and work process in order to help project participants to perform risk management more systematically and rationally in the development phase of urban regeneration project.

Keywords : Urban Regeneration, Risk Management Plan, Risk Identification Checklist

1. INTRODUCTION

1.1 BACKGROUND

Until recently, big cities across the nation, with Seoul as the center, have sought radical urbanization and growth. The government has executed development policies focused on new cities and streets to increase housing penetration rate and meet the increasing demand for land. But such intensive urban development, concentrated on new towns, has reduced the number of settled population, and weakened various functions such as commercial, culture, education and welfare in old towns, which has made the stagnation and declination of the entire or some part of old towns. Urban regeneration project means renewing cities' functions in terms of physical, environmental, social, cultural, industrial and economic aspects or revitalizing the existing functions through improvement project in the entire or part of a city, which is now drawing keen attention from the public.

Large-scale complex development project like urban regeneration project is huge in scale, needs long construction period and various complex facilities. It is characterized by complicated relations with many stakeholders such as public institution, developer, union, contractor, consulting firms and financial institutions. Due to such characteristics, there are frequent accidents like delay of the project, overspending of project budget and failure of the project, which afflicts heavy burdens on individuals or the public. Therefore, systematic risk management is absolutely necessary to efficiently manage various risk factors possible during the project period of urban regeneration. However,

risk management techniques are at introductory levels in Korea's development project sector, and in many cases people tend to manage risk factors not based upon systematic risk management techniques but upon experiences and the situation.

This research is aimed at proposing a risk management plan and work process in order to help project participants to perform risk management more systematically and rationally in the development phase of urban regeneration project.

1.2 SCOPE AND PROCESS

The scope of this research is limited to the development phase of urban regeneration project under urban and residency environment improvement law. The followings are processes and methods of this research.

First, this research arranges the definition and concepts of urban regeneration project and studies and analyzes the precedent researches on urban regeneration projects and risk management.

Second, this research assumes project management organization in the development phase of urban regeneration project for reference, and defines organization system based upon the assumption.

Third, this research defines risk management process in the development phase of urban regeneration project, and also defines applied techniques by stage and work process.

Fourth, this research proposes a risk factor check list which can be applied in risk identification step in the development phase of urban regeneration project, and describes expected effects and conclusion.

2. SURVEY OF THE EXISTING URBAN REGENERATION PROJECT RESEARCHES

2.1 DEFINITION OF URBAN REGENERATION AND DEVELOPMENT PHASE

Urban regeneration means all the actions to resolve physical, social and economic problems of the existing cities, and the term is considered as comprehensive concept that includes compound words such as Urban Redevelopment, Urban Renewal, Urban Revitalization and Urban Renovation.(D. N. Kim, 2001)

There are some separate theoretical discussions and lacks of systematic considerations on urban regeneration in Korea. Urban regeneration is considered as management and development, except new development, in and out of the existing towns, similar to home improvement project, through urban redevelopment project, housing reconstruction and redevelopment project.(H. O. Hong, 2002) Also in Japan, urban regeneration is understood as a combination of projects based upon land readjustment law, urban redevelopment law and housing district renovation law with a project guideline based upon budget enforcement, such as specific housing district, overall improvement promotion, urban revitalization district and overall improvement. Korea's current urban regeneration project-related businesses are nothing but urban reorganization businesses under urban & housing environment improvement law.(C.W. Lee, 2002)

Urban reorganization project consists of 3 phases which are planning phase, implementation phase and completion phase as shown in Figure 1, and the last completion phase, which is a phase to do detail design and construction, is the same with construction phase of urban regeneration project. Therefore, the developing phase of urban regeneration project in this research means the completion phase of urban reorganization project under the current domestic law.

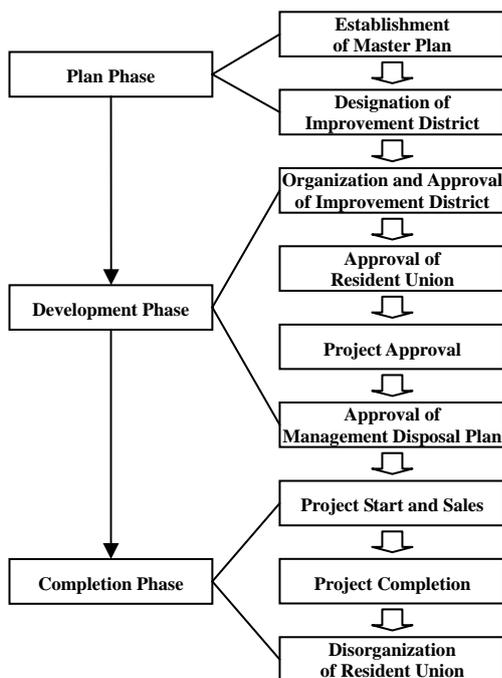


Figure 1. Urban Reorganization Project Phase

2.2 ANALYSIS OF THE EXSITING URBAN REGENERATION PROJECTS' RISK MANAGEMENT RESEARCHES

The research on risk management in urban regeneration project has been conducted in Korea since 2003. Looking at the trend, one is seeking risk factors of development project and risk management methods by phase in the position of project developer, the other is plans to increase returns on investment. This research focused on the first research trend. Table 1 shows a summary of researches.

Table 1. Research Summary of Risk Management in Urban Regeneration Project

AUTHOR	RESEARCH TITLE	SUMMARY
KIM, M. H. (2005)	A Study on the Method of the Risk Management in the Real Estate Development Project	- Project phase definition of real-estate development project. - Risk factors classification of project phase - Criticality analysis of risk factors - Effective risk management strategies
Lee, J. H. (2005)	A Study on the Risk Management of Real Estate Development Project	- Risk type definition of development project. - Risk management strategy in view of financial investors
Kang, J. K. (2003)	A Study on the Risk Management for a Business Rationalization of the Real Estate Development Project	- Project type definition - Project phase definition of real-estate development project. - Risk factors classification of project phase - Risk management strategy

Kim Min-Hyeong(2005) is describing the phases of urban development project as pre-evaluation, development preparation, development and management operation, and draw out risk factors of the project by phase. She analyzed the importance of each risk factor applying AHP techniques, and describes normatively management methods by risk factor.

Lee Ji-Hyeon(2006) divided the risk factors of urban development project into phases of preparation, distribution, construction, completion, moving in and management, and proposed risk factor management plans in the position of financial institutions, developers and contractors.

Kang Jeong-Kyu(2002) divided the risk types of urban development project into legal risk, construction risk, raw material provision risk, market risk and cost risk, and divided the real estate project phase into preparation, progress and management operation. After that, he defines risk factors by phase.

The following is the summary of main characteristics of key researches on the risk management in real estate development project in Korea

First, though most of the researches propose risk breakdown structure and risk factors, they are unsystematic, too summarized and unconnected to project implementation phase.

Second, they just analyzed simple criticality of risk factors, and there is no definition and criteria about risk man-

agement techniques by phase.

Third, there is no risk management plan or process, which enables entire project operation organization to share and manage risks.

As a result from analysis of the existing risk management researches, it is necessary to establish risk management plans and process adjusted for the characteristics of urban regeneration project in order to implement risk management more systematically and rationally.

3. RISK MANAGEMENT PLAN FOR DEVELOPMENT OF URBAN REGENERATION PROJECT

This research defines risk management plan in the development phase of urban regeneration project as a basic frame in order to implement risk management more systematically in project risk management organization.

Risk management organization should be established to be adjusted for organizational characteristics of urban regeneration project, and work process system and work flow of the existing project organization. Through this, project participants will not consider risk management as additional work. This will enhance efficiency by connecting the job with the existing work.

Risk management work process contains the explanation of application techniques and process of risk management by phase. If risk management phase is too complicated and fragmented, and risk management application techniques are theoretically too difficult, it is not a successful risk management process. Therefore, this research needs to define the participants' operation steps in urban regeneration project and application techniques of risk management in the practical point of view.

3.1 RISK MANAGEMENT ORGANIZATION OF URBAN REGENERATION PROJECT

This research established risk management organization in the development phase of urban regeneration project referring to organization of urban environmental management project in Sewoon reorganization promotion district (Sewoon 4 section)¹ which is a research test bed for this research. Urban environmental management project in Sewoon reorganization promotion district has been controlled by a project developer, and has established work cooperation system with public institutions, a residents union (representative group of residents), a construction management firm (CM) and financial institutions (trust funds). The project developer cooperates with public institutions in policy and licensing-related works, with a residents union in establishing unions and sales-related works, with a construction management company in designing and construction-related works, and with financial institutions in financing-related works. Among these cooperators, a CM company is entrusted with the charge of coordinat-

ing and controlling works of designers, contractors and management firms as an agency for project developer.

This research established risk management organization of urban regeneration project as illustrated in Figure 3 based upon Figure 2 showing organization of urban environmental management project in Sewoon reorganization promotion district.

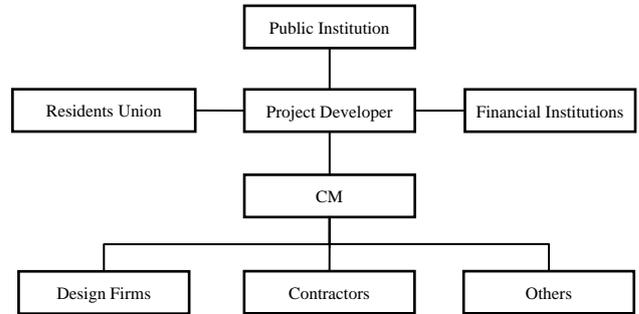


Figure 2. Sewoon Regeneration Project Organization

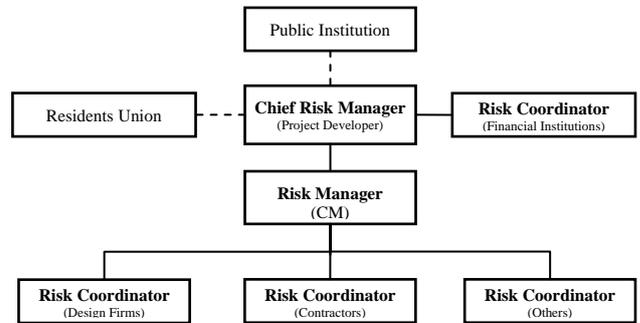


Figure 3. Risk Management Organization of the Sewoon Regeneration Project

This research's risk management organization of urban regeneration project is formed to make a general project administrator control risk management of the entire project.

As the general project administrator is also a project developer in charge of planning and management of the entire project, there should be a chief risk manager (CRM) who has to control overall risk management.

The CM company to be entrusted with project developer's project management work supports the chief risk manager practically as an agency. It should have a risk manager (RM) in charge of collecting information about project risks from main project participants including establishment of risk management plan, process and system, analysis and response to the risks and monitoring and controlling the risks.

Designers and contractors, conducting project practically and directly, should have risk coordinators in charge of identifying risk factors in project implement process in the development phase of urban regeneration project, reporting the identified risks to the CM company according to the designated process, and getting command from the CM company regarding risk management.

Financial institutions (trust funds), sensitive participants

¹ As the back drop region redevelopment project around the existing Sewoon shopping center of Seoul in Korea, project period is from Oct. 2006 to Dec. 2015.

to potential risks at a planning phase of the project, should have risk coordinator in charge of cooperating risk management works with a chief risk manager of project developer. Project developer should inform financial institutions of potential risks and risk management plans during the entire project implementation period, establish work process to closely cooperate each other.

Public institutions have tremendous influence on the licensing and policy decisions regarding a project. But they have a double standard of causing many potential risks related to the laws and systems, and sensitively responding to potential risks in order to successfully implement the project in the policy viewpoint. Therefore project developer should share risk-related information with public institutions in the limited or designated scope.

Last, a residents union or a representative group of residents is the most influential in developing and implementing a project, and have high possibility of having hostile relationship with the project developer regarding project profits. But by providing information about project implementation risk management in the limited or designated scope, the group could be helpful in smooth implementation of the project.

3.2 RISK MANAGEMENT PROCESS OF URBAN REGENERATION PROJECT

Risk management process in the development phase of urban regeneration project should consist of as simple risk management steps as possible to minimize time and efforts and maximize efficiency. Therefore, this research defines the risk management process of urban regeneration project as 4 steps of risk identification step, risk analysis step, risk response step and risk monitoring and control step. Figure 4 shows the risk management process of urban regeneration project.

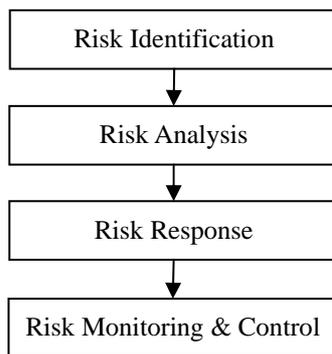


Figure 4. Urban Regeneration Project Risk Management Process

3.2.1 RISK IDENTIFICATION STEP

Risk identification is the first step of risk management process which is identifying all the potential risk factors systematically in and out of urban regeneration project. In this step, risk identification system and techniques with which all the project participants can actively identify risks is very important. The person in charge of this job should make a perfect risk list through risk identification step, and

should conduct the following work process.

First is to select the best way of identifying potential risk factors. Second is to examine origins and triggers of possible risk factors. Third is to identify all the potential risk factors having affects on urban regeneration project.

This research defines the checklist method as a basis of risk identification technique, and suggests selective application of brain storming and expert interview to complement the checklist. The checklist technique, the most popular and practical methods, is methodology to identify potential risk factors in new projects or similar projects by collecting, classifying and organizing the historical risk factors and types.

Risk factor checklist applied to this research is described in the next 3.2.1.1. The following is summary of risk identification work process using checklist method.

Identified risk factors with checklist by each project participants are preliminarily evaluated in the risk evaluation group² of each participants about whether they are should be reported to risk manager or they are analyzed and responded in the project participant level. Risk factors which are determined to report to CM company or project developer in preliminary evaluation should be reported right away. Risk manager of the CM company should conduct detail evaluation of the risk factors reported from designers, contractors and others. Through this detailed evaluation, risk manager should decide whether the risk factors must be analyzed in the participant level, or designate the participant to analyze them, prepare risk analysis plan, and report it to a chief risk manager of project developer. When a chief risk manager approves the plan after examination of it, the designated participant starts risk analysis step. Figure 5 shows a work process of the risk identification step.

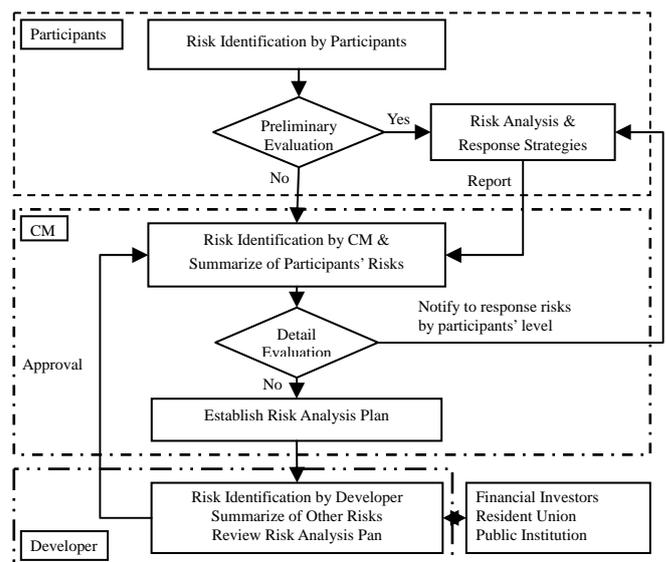


Figure 5. Risk Identification Work Process

² Composed of 3 or 5 persons who have enough construction experiences for evaluating project risks within a project

3.2.1.1 RISK FACTOR CHECKLIST FOR URBAN REGENERATION PROJECT

Table 2. Project Stakeholders Risk Factors in the Construction Phase of Urban Regeneration Project(Partial Sample)

STAKE-HOLDER	CODE	RISK FACTOR
Public Institution (P)	P1	project start and completion approval delay
	P2	urban master plan change
	P3	improvement master plan change
	P4	city and province regulation change
	P5	sales price approval delay
	P6	public appeals
	P7	public infrastructure unpreparedness
Developer (D)	D1	regulation and plan change
	D2	project start and completion delay
	D3	sales and disposal uncertainty
	D4	sales price approval delay
	D5	market structure change
	D6	project cost increase due to material cost increase
	D7	cost increase according to implementation of project approval condition
	D8	project performance inability due to equity capital deficiency
	D9	sales drop due to government policy
	D10	development plan change
	D11	long term development plan overlook
	D12	sales contract cancellation probability
Construction Contractor (C)	C1	consortium company dishonor
	C2	wage change
	C3	law-material cost change
	C4	law-material procurement delay
	C5	project delay by site accidents
	C6	deficiency of application experience in new construction method
	C7	conflicts between construction contractor and resident union
	C8	conflict within consortium
	C9	facility damage beyond contract scope
	C10	supply material specification change
	C11	subcontractor project performance inability

This research has developed risk factor checklist applicable in risk identification step in the development phase of urban regeneration project. First, this research draws out risk factors of each project participant in risk factor dictionary in the precedent research³. The drawn risk factors

³ 1&2 Year Research Results supported by High-Tech

are 90 including 7 for public institutions, 16 for developer, 22 for contractor, 17 for construction management firm, 16 for designing company and 12 for financial institution as Table 2.

After that, this research conducted questionnaire survey⁴ to more objectively verify the drawn risk factors. The survey results are listed by the importance of each risk factor through factor analysis⁵ and criticality analysis. The common risk factors are arranged as representative type.

Last, the risk identification checklist for each project participant in the development phase of urban regeneration project is completed by conferring identification codes to arranged risk factors by criticality and type. Table 3 is a partial example of risk factor checklist for project developer.

3.2.2 RISK ANALYSIS STEP

Risk analysis is a step to quantify the scale of the risks by analyzing the probability of the identified risks and the impact by the risk factors in order to evaluate how the identified risk factors affect to urban regeneration project. The scale of a risk calculated in risk analysis step is called risk value (RV) which is calculated by multiplying of risk probability (P) by impact (C) from the risk. The calculation formula of risk value is like this.

$$\text{Risk Value (RV}_i\text{)} = f(\text{probability, impact}) = P_i \times C_i$$

(i = risk factor)

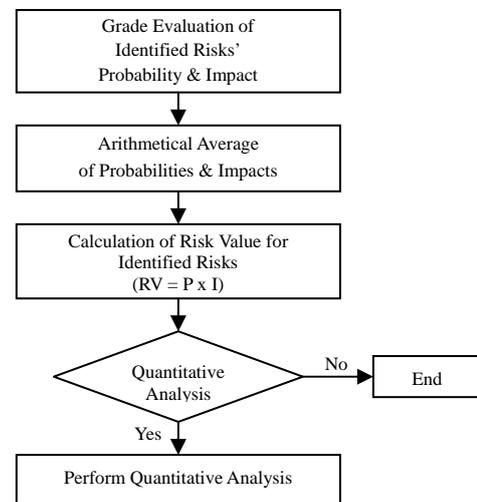


Figure 6. Risk Analysis Work Process

Urban Development Program funded by the Ministry of Construction & Transportation of Korean Government from 2007 to 2008

⁴ Questionnaire survey was performed by 90 persons in urban regeneration project from Oct. 10, 2008 to Oct. 31, 2008, and its response rate is 82%.

⁵ Factor analysis is a statistical method used to describe variability among observed variables in terms of fewer unobserved variables called factors

Table 3. Risk Factor Checklist for Stakeholders in Development Phase of Urban Regeneration Project (Partial Sample)

STAKEHOLDER	RISK TYPE	CODE	RISK FACTOR	Check Box	
				Yes	No
Developer (D)	I. Market and Economic Risk	D I-1	Is there any uncertainty of sales and disposal?	<input type="checkbox"/>	<input type="checkbox"/>
		D I-2	Is there any probability of market structure change?	<input type="checkbox"/>	<input type="checkbox"/>
	II. Law and Regulation Risk	D II-1	Is there any probability of project start and completion approval delay?	<input type="checkbox"/>	<input type="checkbox"/>
		D II-2	Did you review any probability of sales drop related to government policy?	<input type="checkbox"/>	<input type="checkbox"/>
		D II-3	Did you review about changed clauses of law and regulation?	<input type="checkbox"/>	<input type="checkbox"/>
		D II-4	Is there any probability of sales price approval delay?	<input type="checkbox"/>	<input type="checkbox"/>
	III. Other Stake-holders Risk	D III-1	Is there any concern about lowering of project performance ability due to lack of equity capital?	<input type="checkbox"/>	<input type="checkbox"/>
		D III-2	Is there any probability of conflict between construction contractor and resident union?	<input type="checkbox"/>	<input type="checkbox"/>
		D III-3	Is there any probability of improper decision about lease and sales prices?	<input type="checkbox"/>	<input type="checkbox"/>
		D III-4	Is there any probability of conflict between developer and resident union?	<input type="checkbox"/>	<input type="checkbox"/>
	IV. Revenue and Cost Risk	D IV-1	Did you review any probability of project cost increase coming from material cost increase?	<input type="checkbox"/>	<input type="checkbox"/>
		D IV-2	Is there any probability of additional costs for fulfilling project approval condition?	<input type="checkbox"/>	<input type="checkbox"/>
		D IV-3	Is there any probability of sales contract cancellation?	<input type="checkbox"/>	<input type="checkbox"/>
		D IV-4	Do you have enough knowledge about design and construction?	<input type="checkbox"/>	<input type="checkbox"/>
	V. Site Circumstance Risk	D V-1	Did you check site circumstance development plan change?	<input type="checkbox"/>	<input type="checkbox"/>
		D V-2	Didn't you overlook long term development plan of project site?	<input type="checkbox"/>	<input type="checkbox"/>

The methods to quantify risk value in risk analysis step are largely divided into qualitative risk analysis and quantitative risk analysis by whether there are objective data for risk analysis, and the risk factor is repetitive or not. (PMBOK, 2002) Qualitative risk analysis is used when objective data for risk analysis are not enough and the risk factor is not repetitive. The quantitative risk analysis is used when there are enough objective data and the risk factor is repetitive with statistics probability analysis technique.

In risk analysis of the development phase in urban regeneration project, qualitative risk analysis which is based upon personal data and experiences of project participants, is considered as more practical and realistic way than quantitative risk analysis which needs sufficient objective data, repetitive characteristic of risk factors and expert knowledge on statistics probability in order to reflect the characteristics of construction project and attract active participation and understanding among staff in construction sites. Therefore, this research defines qualitative risk analysis method as basic technique and quantitative risk analysis as complement technique.

To quantify the identified risk factors, this research suggests a grade judgment method among the qualitative methodologies. Through the grade judgment method, risk factor probability and impact are rated by experts or a risk evaluation group. This method is proper when objective data are not sufficient and the risk factors are not repetitive, but this method necessarily needs safe device and quantification of the results to eliminate errors of subjective judgment

and bias of the evaluator. To minimize the errors and bias from subjective judgment, this research suggests establishing a risk evaluation group with 3 to 5 persons who has enough experience of construction and quantifying the rates judged by each evaluator, and calculating arithmetic average.

And also this research suggests sensitivity analysis, monte-carlo simulation and decision making tree among quantitative methods as complement qualitative methods. Figure 6 shows the summary of work process by grade judgment method in risk analysis step.

3.2.3 RISK RESPONSE STEP

Risk response step is the stage of determining whether to respond to the quantified risks in risk analysis step, establishing and implementing the most effective response strategy. The strategies of responding to risks generally consist of risk acceptance, risk avoidance, risk mitigation and risk transfer.(Chapman, 2000) This research defines risk mitigation strategy as a basis of risk response strategy because risk mitigation strategy is so flexible in application while risk avoidance and risk transfer is very difficult to implement realistically.

To establish and implement risk response strategy, evaluation of risk value calculated in risk analysis step is needed because risk response strategies require a lot of project costs, and it is practically impossible of responding to all identified and analyzed risks.

Therefore, there should be a clarified criteria to evaluate risk value which is called risk threshold (RT).(Grey, 2000)

Risk threshold should be set up through comprehensive consideration about project environment, project organization, project size and type, and the other external environments. Risk threshold should also be set under mutual agreement within each project participant or team. Therefore, self-setting of risk threshold in risk evaluation group of each participant is a basis in this research.

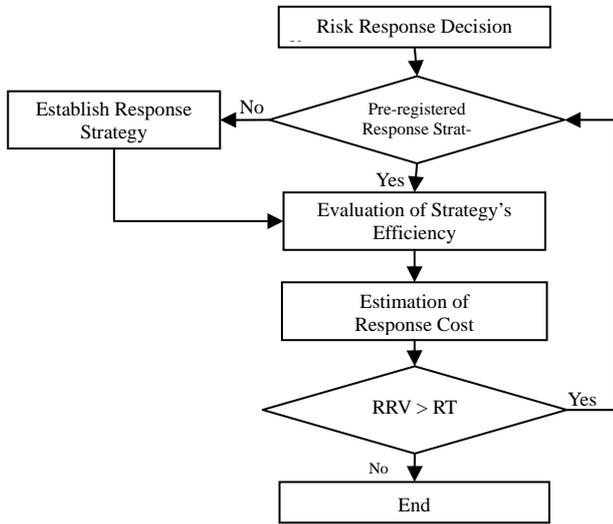


Figure 7. Risk Response Work Process

Further, the efficiency of risk response strategy is needed to be evaluated. The remaining risk after implementation of response strategy is called residual risk value (RRV).(PMBOK, 2002) Residual risk value varies according to the effectiveness of response strategy. If residual risk value exceeds risk threshold continuously, additional response strategy or new strategy should be set up. Figure 7 shows the work process of risk response repetition process in risk response step.(S. G. Kim, 2002) It consists of calculating residual risk value adjusted for efficiency of response strategy and risk threshold, and setting response strategy and cost of the strategy.

3.2.4 RISK MONITORING AND CONTROL STEP

Risk monitoring is to continuously evaluate the change of risk values and whether the risks remain or not after risk response. Risk control is a work process to establish and implement new or additional risk response strategy if necessary after performing additional risk analysis about re-evaluated risk factors at the risk monitoring step. In the risk monitoring and control step, risk response strategies should be established and implemented additionally in case of exceeding the changed risk values over the risk threshold.

Risk monitoring and control is to evaluate the changes of risk factor in project participant level, and the results of evaluation should be continuously reported to the project developer in order to share those with all project participants.

Final stage of risk monitoring is a risk removal. The status of a risk removal means to complete project work

which risks were identified. Therefore, risk monitoring and control should be performed until the risks will be removed completely. And it often happens to identify new risks during risk monitoring. In this case, risk management process should be performed again from risk identification step. Figure 8 shows the summary of work process in risk monitoring and control step

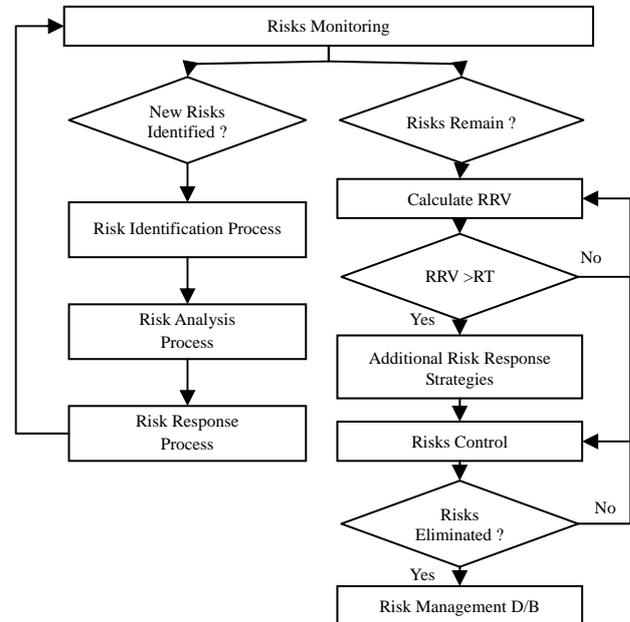


Figure 8. Risk Monitoring and Control Work Process

4. CONCLUSION

Recently, intensive urban redevelopment concentrated on new towns has reduced the number of settled population, and weakened various functions such as commercial, culture, education and welfare in old towns, and made the stagnation and declination of the entire or some part of old towns. Urban regeneration project means renewing cities' functions in terms of physical, environmental, social, cultural, industrial and economic aspects or revitalizing the existing functions through improvement project in the entire or part of a city, which is now drawing keen attention from the public.

However, urban regeneration project is huge in scale, needs long construction period and various complex facilities. It also is characterized by complicated relations with many stakeholders. Due to such characteristics, there are many risks in the project. Therefore, systematic risk management is absolutely necessary to efficiently manage various risk factors. However, Korea's researches and practical application on risk management of urban regeneration project are at the introductory levels.

A risk management plan is to define and set up of overall risk management works and processes in advance, and it is one of the most crucial factors affecting future risk management works. The purpose of this research proposes a basic model to establish risk management plan of urban

regeneration project. This research examined and analyzed the status of risk management of urban regeneration project, and then defined the risk management steps suitable for work characteristics of urban regeneration project, and also defined risk management techniques in each step and work process.

Additional researches for verifying the results of this research in the actual urban regeneration project are scheduled. Through additional researches, a higher quality risk management plan for urban regeneration project will be drawn up, and assist to implement risk management in urban regeneration project more systematically and rationally.

REFERENCES

- Chapman, C. and Wood, "Project Risk Management Processes, Techniques and Insights", Wiley, 1998
- Grey, S., "Practical Risk Assessment for Project Management", John Wiley & Sons, 1998
- Kang, J. K., "A Study on the Risk Management for a Business Rationalization of the Real Estate Development Project", Master's Thesis of Kangwon National University, 2003
- Kim, D. N. and Bong I. S., "A Study on the Policy of Regeneration and Remodeling for Large Multi - story Housing Estate / Complex as Urban Regeneration in France", Journal of Korea Planners Association, Vol. 36, No.2, 2001
- Kim, M. H., "A Study on the Method of the Risk Management in the Real Estate Development Project", Construction & Economy Research Institute of Korea, 2005
- Kim, S. G., "A Model of Construction Project Risk Response Process based on the Risk Threshold applying a Concept of VaR", Doctoral Dissertation of Hanyang University, 2002
- Lee, C. W., "Urban Regeneration and Cultural Identity", Daegu-Kyeongbuk Forum, No. 38, p40, 2002
- Lee, J. H., "A Study on the Risk Management of Real Estate Development Project", Master's Thesis of Konkuk University, 2005
- Hong, H. O., "A study on Urban regeneration through the redevelopment of old apartment houses", Regional Social Development Research Vol.27, No.1, p247~268 2002
- PMI, "Project Risk Management", PMBOK, pp133-134, 2002

(Data of Submission : 2009.2.9)