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APPROACHES FOR PERFORMANCE MEASUREMENT OF URBAN RENEWAL MEGAPROJECTS

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ABSTRACT

Urban renewal projects have been increasingly undertaken in many nations to cover diverse functions through rehabilitating complex spaces vertically and horizontally. Urban renewal projects usually require a great amount of resources and interrelationships which inherently involves various participants and stakeholders from both public and private sectors. Hence, urban renewal projects need to be viewed on megaproject aspects that should be managed not from being a sum of single projects, but from a synthesized program perspective. While there have been numerous studies on developing project performance system through identifying performance indicators and evaluating performance of a project, there is no well-defined research as yet of considering unique characteristics of complex megaprojects, particularly for the domain of urban renewal projects. This study aims at establishing performance indicators for urban renewal megaprojects at the program level. This paper then provides a future direction for systematic and integrated urban renewal megaproject management to periodically monitor and forecast the status of a project.

KEYWORDS

Megaproject, Performance Measurement, Program Management, Urban Renewal

INTRODUCTIONS

Large-scale urban renewal (hereafter, referred to as UR) is becoming a significant trend of global construction market of today. There are already many successful UR cases reported across the world; Roppongi Hills in Japan, La Defence in France, Bilbao in Spain, among others [9]. In addition, a number of UR projects are now in progress or under consideration in developed and developing countries such as Korea, Vietnam, and Kazakhstan. UR projects contain`n diverse functions such as residence, commerce, business, public works, culture, leisure, among others with revitalizing current complex spaces vertically and horizontally. UR projects also have a great impact on the local society, people, regional economy, and the nation's level as a total. Therefore, UR projects need to be viewed as megaprojects that should be managed not from being a sum of single projects perspective, but rather from perceiving a synthesized program perspective.

This study aims to establish performance indicators of UR megaprojects and to support an effective measurement system from a public participants' perspective. This study systemizes the performance hierarchy from program to even activity level. Further, we consider not only construction progress performances but socio-economical and public views such as sustainability and customer satisfaction as well.

To this end, the derived performance indicators are classified under the life-cycle stages, and, finally, this paper provides the framework of integrated UR megaproject management as a function of performance assessment.

1. LITERATURE REVIEW

There are a number of researches on measuring and assessing performance of a construction company or organization, and even particularly for a construction project from diverse perspectives.

As an example, Egan presented the Key Performance Indicators to assess the performance of construction projects [1]. KPI classifies those areas into two categories: project performance and company performance.

Construction Industry Institute also developed Benchmarking & Metrics which is composed of six categories: cost, schedule, safety, changes, rework, and productivity [10]. In addition, Kaplan and Norton [4] proposed the Balanced Scorecard (BSC) that included four main categories: financial perspective, internal business processes, customer perspective, and organizational learning.

While there have been numerous studies on developing project performance measurement methods and systems, there is no well-defined research as yet of considering unique characteristics of complex megaprojects, particularly for the domain of UR. There is thus a need to establish performance indicators and measurement system for a success of UR with a consideration of megaproject features along the entire life-cycle and loads of diverse functions.

2. UR AS A MEGAPROJECT

2.1. Features of a Megaproject

Megaprojects are typically defined as one that is over US$1 billion [2]. However, they are more complex to define with just numerical threshold.

Fiori and Kovaka [2] presented five key characteristics of megaprojects: magnified costs, extreme complexity, increased risk, lofty ideals, and high visibility. These features lead to more complexity and significant challenges to stakeholders than is the case of typical projects.

Thus the performance of megaprojects tends to be remarkably poor in terms of cost and time. A significant gap occurs in many cases between what is expected from enormous investment of resources and what is actually obtained [3], [7].

Flyvberg et al. [3] argued that the main cause of those overruns was lack of realism, in other words, delusion of success. In a similar way, Merrow [7] discussed that megaproject outcomes were strongly affected by cultural, legal, and political factors. In addition, institutional factors related with environmental regulations and innovations also play an important role in megaproject outcomes [7].

Subsequently, unsystematic project planning or failure to properly and effectively manage complex social, legal, political, and environ-mental uncertain-

ties often produces the poor performances and costly consequences in the course of megaproject development.

2.2. Complexity of UR as a Megaproject

The ultimate goal of UR is to improve urban life by: (1) redeveloping aged/high density residential housings, (2) enhancing public supplies and facilities, and (3) revitalizing the business area and local community [8]. The Korean Urban Renaissance Center [5] also presented three objectives of UR: (1) to repair and develop decayed existing urban district in systematic way, (2) to induce unique regional socio-cultural characters through diverse participants, and (3) to rehabilitate urban district including regional industry and economy overall.

Meanwhile, according to Kim et al. [6], the most critical success factor (hereafter, referred to as CSFs) of Tokyo area development's case was the systematic and efficient management of participants from government and public agency. Also, there are nongovernmental organizations to participate in government's urban development such as Business Improvement District in US, and Town Centre Management in UK [6]. Other CSFs include; correspondence with the national wide plan, economical and sustainable urban renewal achievement, meets the public the public demand, and others. Thus, UR projects yield very important and extensive public affairs. In addition, since UR involves an enormous amount of investment and has a great effect on public concerns, UR project is commonly handled via diverse stakeholders from public and private sectors.

All together, UR projects portray the following megaproject perspectives: (1) to require a huge scale budget investment, (2) to confront complex challenges from social, legal, and political uncertainties, (3) to satisfy public benefits by meeting the higher standard of public concerns, (4) to create a quality landscapes, skylines, and outlooks by harmonizing with existing surroundings.

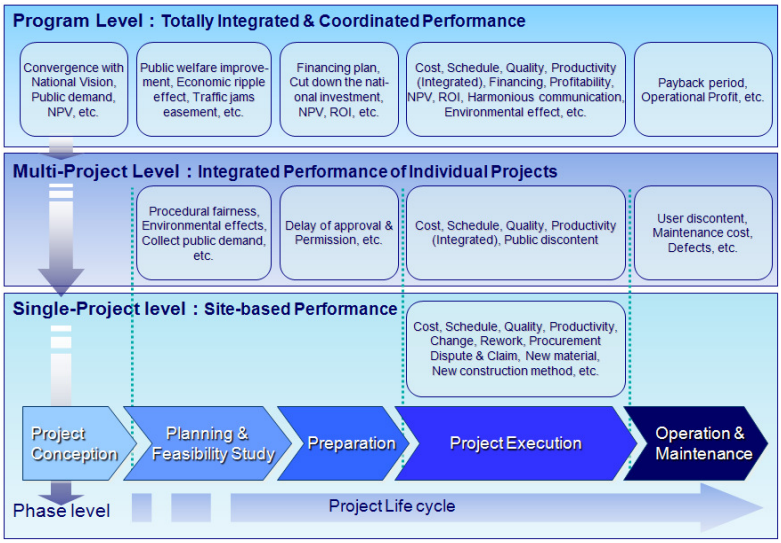

Figure 1 Concept of UR Performance Management

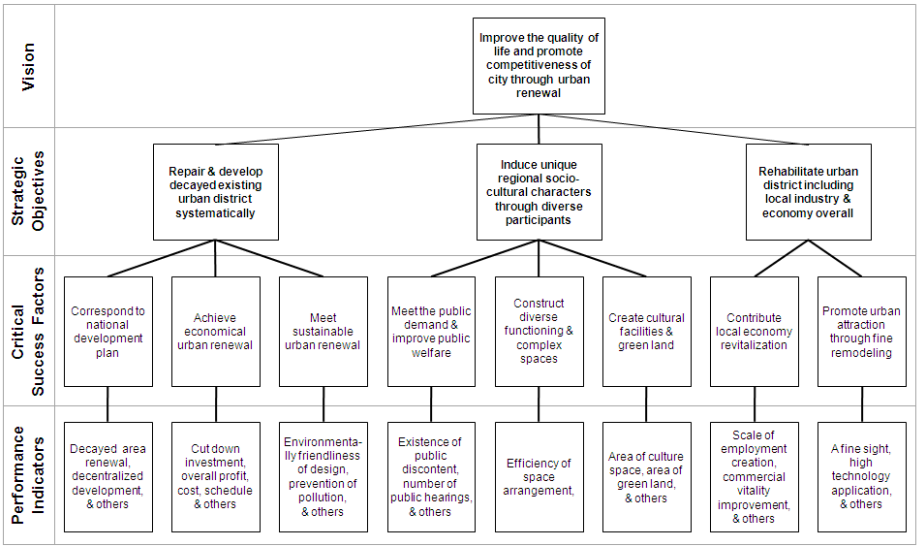

Figure 2 Derivation Process of Performance Indicator

3. UR PERFORMANCE INDICATORS

Establishing performance indicators of UR requires considering megaprojects' features as well as unique complexity of UR that affect the level of performance. As previously noted, most of current performance frameworks are contingent on construction progress data at single project level [1], [8], [10]. However, it is of limit in UR megaprojects where there exist numerous sub-projects, and huge amount of data at a project level. Given the lack of current approaches, thus, UR performance is managed from a synthesized program as well as project level to understand the integrated and coordinated worth constituting UR.

Figure 1 shows the concept of UR performance management; showing that performance levels are arranged vertically while, the life-cycle of UR (conception, planning and feasibility study, preparation, execution, and operation and maintenance) are displayed horizontally.

3.1. Deriving Performance Indicators

According to Kaplan and Norton [4], a framework of deriving performance indicators is composed of the following three steps; (1) to translate the vision into strategic objectives, (2) to derive CSFs of each strategic objective, and (3) to define key performance indicators from CSFs. In this study, we derive performance indicators based on the vision and strategic objectives of UR projects proposed by KURC [5], extensive documentation analysis, and CFSs that are stated in the previous sections.

Firstly, to meet the vision of UR megaprojects, the key objectives encompass a systematic recreation of old urban areas, as well as inducement of regional socio-cultural characters and rehabilitation of urban district.

Then, the developers (government, private clients, or consortium forms) of UR should consider the critical factors, particularly focusing on how much a given project satisfies; (1) consistency with national development plan, level of economical efficiency, and degree of sustainability, (2) inclusion of public demands, diverse functioning/complex spaces, and cultural spaces/green land supply, and (3) contribution to revitalization and promotion of attraction, respectively.

Lastly, performance indicators that in turn measure the control level of each CSF are derived. For example, the criteria on how well the client reflects the public demands can be measured by the relevant

gauges such as number of public hearings held during project conception and existence of public discontent based on opinion surveys (see Figure 2).

3.2. Performance Measurement Framework

Since URs have a great impact on the local community and national economy as well; they possess the characteristics of public facilities. In this respect, the general public should be customer of UR in line with public agencies and private investors. Project-related factors such as cost, schedule, quality, and others are also considered to be more direct CSFs.

There may be material or method innovations for the purpose of improving benefits of a megaproject. Lastly, with growing public concerns on environment and sustainable development, environmental impacts become more key issues on construction projects.

Therefore, the main performance categories based on critical factors of UR megaprojects can be partitioned into five classes: customer, financial, execution process, innovation, and sustainability perspectives. All together, Table 1 represents the framework of UR performance based on the concept of Figure 2 and the main categories. Details in each cell are the performance indicators in association with the matrix structure.

Therefore, main performance categories based on critical factors of UR megaprojects could be arranged into five classes: customer, financial, execution process, innovation, and sustainability perspectives. Table 1 represents the framework of UR performance based on Figure 2. Detail items in each cell are expressions of performance indicators. Each indicator is formulated quantitatively or qualitatively to assess the degree of achievement. In addition, the framework was evaluated based on the feedbacks by the industry experts and governmental participants. They are not defined here for the sake of brevity.

Table 2. Framework for UR Performance

	Customer Perspective	Financial Perspective	Project Processes	Innovation Perspective	Sustainability Perspective
Project Conception	Convergence with national vision & strategy, Balanced development, Harmonious communication among executing organizations	NPV, B/C ratio, ROI	Cost, Schedule (for conception)	Creativity, Innovation of concept	Environmental feasibility
Planning & Feasibility Study	Meet public demand, Improvement of public welfare & service, Balanced development, Local economy revitalization, Traffic jams easement	Financial management, Cut down the national investment, Economic ripple effect, NPV, B/C ratio, ROI	Cost, Schedule (for planning & FS)	Design innovation Spatial innovation	Evaluation of environmental effects
Preparation	Reflection of public opinion, Green tract of land supply, Cultural institutions supply	Financial management, Sales ratio of building, NPV, B/C ratio, ROI	Delay of approval & permission, Cost, Schedule (for preparation)	Design VE application	Environmentally friendly design
Project Execution	Public discontent, Employment promotion, Relationship of Stakeholder's, Requirement satisfaction, Conflict between labor & capital, Dispute & claim	Financial management, NPV, B/C ratio, ROI	Cost, Schedule, Productivity, Change, Rework, Procurement, Accident	VE application, First-of-a-kind technology, New material, New method, Project management with high technology	Environmentally friendly material and method
Operation & Maintenance	Public discontent	Payback period, B/C ratio, ROI, DSCR	Cost, Schedule (for maintenance)	High maintenance technology	Maintenance cost, Defect

4. SUMMARY AND CONCLUSION

This study presents the early version of a framework for evaluating UR megaproject's performance. The framework is composed of main performance categories and its life-cycle; aiming at considering diverse layers of performance. Applying the framework to the actual UR cases can validate the proposed system. The writers currently involved the UR project under planning and construction. Based on our involvement, the proposed framework is being considered to investigate the applicability, completeness, and usefulness through a pilot allocation to the real cases as performance measurement systems. The results will be presented in the future companion paper.

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