Quantitative Management Framework for IT Program

Ra Jong Hei*, Choi Kwang Don**

목 차

Key Words : IT projgram, Quantitative management, Project management

Abstract

공공부문 정보화사업의 효율적인 관리를 위해서는 정보화사업의 특성을 반영한 관리방법론이 필요한 상황이다. 그러나 기존의 유사한 프로젝트관리의 경우 그 내용이 시스템공급자 위주로 되어 있을 뿐만 아니라 추상적이고 다양한 해석을 가질 수 있어 공공부문에서는 적용하기에는 어려움이 많았다. 따라서 본 연구에서는 공공부분에서 정보화사업이 갖는 특성을 반영하여 개별 사업에 따라 관리를 용이하게 하고, 성과측정 기반의 관리 모델을 제시하였다. 제시한 관리방법론 프레임웍은 실증분석과 보완을 거쳐 최종적으로 국내의 다양한 정보화 사업 프로그램과 각 부처의 독자적인 사업관리에 적용될 수 있을 것으로 판단된다. 이러한 사업관리 방법론의 적용을 통해서 사업관리의 과학화 및 체계화를 이루어 궁극적으로 정보화사업의 성공적인 추진 및 관리를 도모를 기대한다.

* Division of e-business, Gwangju University, e-mail:jhra@gwangju.ac.kr, (062)670-2323
** Division of e-business, Hansei University, e-mail:kdchoi@hansei.ac.kr, (031)450-5226

I. Introduction

Arrival at Informationage, interesting of infrastructure construction is higher and the most of system is constructed for business processing and customer service enhancement in pubic sector. For promoting the successful IT project and using the efficiently budget, IT program magement is essential. However, there is no comprehensive methodology for project management that reflect the characteristics of IT projects in the public sector. The existing methodology of project management focuses on system providers, so it is difficult to apply the pubic sector.

This paper presents the application ideas by aiming at supporting the effective management of IT project in the public sector. This study concludes that the most prominent feature of IT program methodology in the public sector is not only to provide indigenous methodology suited for project management in the domestic and international environment but also to make the public IT program management measurable and visible on the basis of performance management system. Therefore, what is found in this study makes efficient management of IT programs by making use of the findings and maximizes investing performance of the IT programs in the end.

This study makes up the weak points of existing project management methodology like CMM and SPICE adding the subject of management, the extent of application, and management method. Through these customization for public sector environment, this study establishes the framework of project management methodology with processes and rules that could be applied in the public sector.

II. Cases & issues

1. National promotion status and problems

IT Promotion in our country originated when the government launched computer network of administration work in late 1980s. The IT project is being driven systematically on the basis of 'CYBER KOREA 21'. Over the year 2004, government spent buget of ₩2,300 billion on national IT project including cyber government and it is getting bigger. Although various types of IT projects are promoted nationwide, most of the projects is dealt by each ministry individually. According to the existing studies related to IT project management in the public sector, major problems show up in promotion and management of IT project in spite of minor differences among the accept an order and placing an order. They are unclear user

requirement, communication problems between contractors and agreement limitation, difficult management owing to operation in the public sector, disability to control the projects and high dependence on contractors in management[9,13,17]. Similar framework and guidelines like ISO/IEC 12207, PMBOK of PMI, SPICE, SA-CMM, Cobit of ISACA have to be complemented to be applied to a public sector and the proper education and public relations on these frameworks have not existed. The person has recently started paying attention on these frameworks.

The Accept an order and Placing an order are recognize these matters and point out that there are no concrete IT project managements as a medium of communication. In addition, IT projects driven by MIC(Minister of Information and Communication) has inflexible outlines and directions in managing IT support project. It makes it difficult for businesses to manage projects. Businesses have difficulty in promoting and managing projects on account of unclear instructions for details. Studies suggest that outlines and directions be revised to be flexible so that business can manage projects. As a result, this study presents appropriate framework for IT management methodology that reflects problems from the existing management methodology.

2. Cases of IT program management

UK operates 'Gateway Process' so that projects ordered by its central government can control IT projects efficiently[15]. Every IT procurement project should apply this process, ministries and public agencies review IT projects by using it, and they report the results to the supervisory commission of OGC(Office of Government Commerce). The main purpose of this process is to solve problems of government supply projects after reviewing by means of the publicly approved process and this makes supplies efficient since performers can expect expenses an results easily. Gateway Process review each major turning point before development is performed. This kind of turning point is called 'Gate'. Each project has 5 gates and each gate operators gateway review. The head of each ministry decides the project promotion on the basis of the results after reviewers get reports. Eventually, this process made 5% budgetary profit from 0.1% budgetary allocation in operating 16 pilot projects on a £3000 scale in 2001.

Gateway Process of UK is different from that of our country in that it applies standard review framework , which was developed according to the situations and environment of UK, in monitoring IT projects in the public sector and its efficiency is very high. As a result, this study presents more scientific and systematic IT project management on the basis of UK methodology.

3. Issues on IT program management

It is said that IT projects or information system development project comes to naught act the rate of more than 80% nationwide and worldwide[14]. Even though the success-failure decision criterias are varied, successful cases are very rare in terms of satisfaction of people joining the project. Especially, many projects are closed regardless of many problems with the inside system. Many a researcher points out major factors affecting the failure of IT projects[2,11,17]. They are i) false prediction to initial expenses and duration, ii) no right and effective application of revised plans, iii) making the same mistakes again without proper training on manager's role performance. iv) wrong direction in performing projects without knowing actual environment. Meanwhile factor iii) and iv) are directly related to IT project management methodology. Therefore, when methodology is proposed, these major factors should be considered. It means methodology can't accommodate actual IT environment and project managers perform the project without any real experience. Consequently, methodology should reflect special features of the projects, not general system development [13].

III. Proposed methodology for IT program

1. Basic issues for methodology

To accomplish scientific management of IT in the public sector, the parties concerned and main managers should agree with environment factors, situations and features and provide methodology framework for systematic and scientific management of IT projects so that they can apply it to IT projects in the public sector[4,5]. There are two basic courses ; i) suggestion and application of appropriate management standard, ii) introduction of quantitative performance management system.

1) Suggestion and application of appropriate management level

Before mentioning the methodology framework, definition management's level is essential to decide major targets of IT projects. However, it is hard and crucial to determine the level. It is not easy to establish the exact management's level in terms of the existing subject groups. Although done, each group has differences in the level. When subject groups are divided into 3 different groups ; agency in full charge, managing agency, developer,

CMM certification in the public sector, it is difficult to discuss management level. But it is expected below level 2[9]. Accordingly, if practical situations are taken into consideration, the level 2 of SA-CMM is fine to satisfy the management's level. This methodology presents procedures and techniques for IT projects to support core process area that is necessary more than level 2 of CMM.

2) Introduction of Quantitative Performance management system

As we see recent methodology like SA-CMM, SPICE, Cobit-Ⅲ, international standards and UK cases, quantitative measurement system tends to be generally introduced.[1,3,6,7].

Dabbins & Donnely survey shows 11 kinds of common successful factors (security of continuous management clarification by using standard, schedule management, systematic quality control. etc) to ensure information system in the public sector[2]. It is said that project management by using measurable standard is the most important of all factors. As a result, IT project management methodology needs to accept this factor. in this paper discussed management methodology for IT project and apply quantitative measurement system to secure management clarification and high performance.

2. Structure of IT project management methodology

Methodology proposed in this study is the actual, comprehensive guide that comprehends all steps including the establishment of strategic course, accomplishment of planning, management and review of processed services. This includes supports and instructions for comprehensive project management[8, 10,12]. In general, quality evaluation of information system development is established and reviewed at every step in favor of developers and users. However, second-level evaluation is desirable for performance review because IT project management has its characteristics.

The structure of IT program management methodology is illustrated in figure 1. It consists of management area, each phase. Each phase is made up of abstract of phase, structure of phase, activities, check item & check list, evaluation list. Management area has 4 steps (manager selection, development, completion, operation) according to turning points in life cycle for the whole project management. manager selection is a series of process from creation to assignment, manager selection, and singing the contract. Development area includes activities like commencement, supply, IT planning, analysis, planning, interim audit, and test. Completion area contains final audit, inspection, completion.

Operation area is composed of ownership transfer, operation, and management.

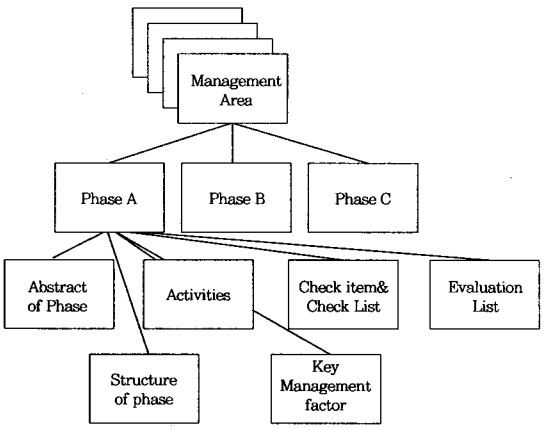

Figure 1. Structure of IT Program Management Methodology

Table 1. Four phases of Management Area

Management Area	Phase
Developer Selection	IT planning, Assignment, Developer selection, Contracting
Development	Commencement, H/W Supply, Information Planning, Analysis, Design, Audit, Implementation, Testing
Completion	Inspection, Completion
Operation	Ownership transfer, Operation and management

Meanwhile, each phase is the basic unit for IT project management and life cycle of overall project management consists of 16 phases. This detailed phase is restructured on the basis of process from IT support project and knowledge & information resource management performed by NCA. Abstract of phase describes outlines of related phases. Structure of phase presents activities and its process. The Activities deals with major management points of detailed activities. Key management objectives and CSF(Critical Success Factor) to control them successfully. With check item & check list, major checking items are defined and detailed check lists are presented by reflecting successful factors and check points.

Management subject are designated according to detailed check items. Evaluation lists specify management subjects to make it possible separating check items. It should be divided into two items; compliance evaluation (A) and performance evaluation (B) of project accomplishment.

Table 2. Example of check list

Major check item	Detailed check item	Measurement				NIA	Type	Subject		
		F	L	P	N			CA	MA	DE
2.1	2.1.1					A	O	O		
	2.1.2					B	O	O	O	
	⋮									
2.2	2.2.1					A		O	O	O
	2.2.2					B				O
	⋮									

Remarks) F(Fully achieved), L(Largely achieved), P(Partially achieved), N(Not achieved), A(compliance evaluation item), B(performance evaluation item)CA(Complete-charge Agency), MA(Management Agency), DE(Developer)

3. Performance measurement

This section describes performance measurement of major check items in 16 phases of IT project management according to IT project management methodology presented in the prior section. SPICE of ISO/IEC provides measurement and evaluation model as a basic concept[7]. SPICE is suited for determining risk from organization or project review and its successful performance. And it also has similarity to IT project management activities inthat SPICE collects proof and performs suggested modification. In this respect, evaluation performed by SPICE is appropriate for measuring and reviewing IT project management. Meanwhile, measurement of performance results from major check items of 16 phases in IT project management is distinguished according to check item features. And it also divided two cases ; simple performance evaluation and performance evaluation of project accomplishment. However, in a more completed management methodology sense, performance evaluation of project accomplishment for all detailed check items needs to be reviewed. As a result, this study presents two types of measurement in terms of compliance and performance.

1) Performance level measurement

Most of the major check items for each phase in IT project management methodology determines propriety of project management by measuring management performance level. SPICE divides process level into 4 phases to determine performance level of IT project management. managers determines performance level of major check item with proof collected through proof collection procedure.

① Not achieved (N) : 0%~15%

- Almost no performance proof of detailed check items defined in major check items.

② Partially achieved (P) : 16%~50%

- No performance proof of detached check items defined in right systematic approach.
- Some kind of performance is not possible to predict.

③ Largely achieved (L) : 51%~85%

- Outstanding performance proof in right systematic approach and related check items.
- Process performance can be varied according to areas.

④ Fully achieved (F) : 86%~100%

- Perfect performance proof in complete, systematic approach and detailed check items defined in major check items.
- No weak-points all over the project.

Table 3. Performance level measurement

Detailed check item / Major check item	1	2	3	4
1.1	N	P	P	L
1.2	F	L	P	P
1.3	L	N	P	L
1.4	L	F	P	F

2) Performance achievement measurement

Major check items for performance achievement use P(pass) and F(fail) to determine it achievement. For the final measurement result, P(pass) is turned into F(fully achieved) and F(fail) is N(not achieved). Final evaluator comes from the result added to performance level measurement.

Table 4. Performance achievement measurement

Detailed check item / Major check item	1	2	3	4
1.5	P->F	P->F	F->N	P->F
1.6	F->N	P->F	P->F	P->F
1.7	P->F	F->N	P->F	F->N
1.8	F->N	P->F	P->F	F->N

4. Evaluation of performance results

Evaluation of managing level using major check items use vector type evaluation used in SPICE. This evaluation can be relatively compared with other projects and make a contribution to management level achievement objectives and improvement of management methodology. Evaluation procedures are :

① Measurement results divides detailed check items F(fully achieved), L(largely achieved), P(partially achieved) and N(not achieved)

② Measurement results are calculated by vector percentage

③ Performance level can be measured by adding all values from major check items repeatedly : To measure achievement level in phase 1, for instance, major items(1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8) is (0, 25, 50, 25), (25,25, 50, 0), (0, 50, 25, 25), (50, 25, 25, 0), (75, 0, 0, 25), (75, 0, 0, 25), (50, 0, 0, 50), (50, 0, 0, 50). Average of each check item performance level is (40.625, 15.625, 18.75, 25). In phase 1, therefore, major check items get that F is 40.625%, L is 15.625%, P is 18.75%, N is 25%.

④ When average values from F and L is not exceed 60%, it is impossible to proceed the next phase.

Table5. Performance level measurement

Major Check Item	Fully achieved (F)	Largely achieved (L)	Partially achieved (P)	Not achieved (N)
1.1	0(0)	25(1)	50(2)	25(1)
1.2	25(1)	25(1)	50(2)	0(0)
1.3	0(0)	50(2)	25(1)	25(1)
1.4	50(2)	25(1)	25(1)	0(0)
1.5	75(3)	0(0)	0(0)	25(1)
1.6	75(3)	0(0)	0(0)	25(1)
1.7	50(2)	0(0)	0(0)	50(2)
1.8	50(2)	0(0)	0(0)	50(2)
Average	40.625	15.625	18.75	25

*() : Each unit of performance level

IV. Conclusion

This paper presents the application ideas by aiming at supporting the effective management of IT projects in the public sector driven by local governments, applying quantitative assessment, and developing quantitative measurement and check lists to evaluate methodology framework, each process and detailed activities in the public IT projects. Considering that existing frameworks and guidelines like ISO 12207 and CMM are not optimized for the application in the public sector, this study suggests framework model with flexibility, expansion, and simplicity. And this study is suggestions on the application the framework in the twenty IT projects of NCA in 2003 and in various IT projects and information projects driven by the departments of government.

However, the existing IT project management methodology in the public sector is designed by using models from NCA. So, it deals with common and general points in project management. Taking influence into consideration, this management methodology should be revised properly to apply all public sectors after the parties concerned provides opinions, model tests are applied, and application possibility is identified step by step to minimize side effects. Further researches and activities are needed in the future.

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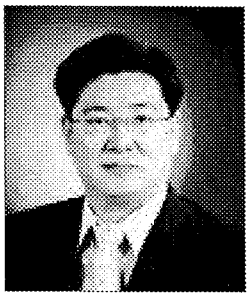
저자약력

나종회 (Jong Hei Ra)

· 1990 성균관대학교 공과대학 정보공학과 졸(공학사)
· 1992 성균관대학교 일반대학원 정보공학과 졸(공학석사)
· 2001 성균관대학교 일반대학원 정보공학과 졸(공학박사)
· 1995 ~ 1999 한국전산원 국가정보화센터 주임연구원
· 2001 ~ 현재 광주대학교 e-비즈니스학부 조교수
· 관심분야 : 정보시스템 성능평가 및 감리, 전자상거래, e-비즈니스



최광돈 (Kwang Don Choi)

· 2001. 광운대학교 대학원 경영학과 (경영학박사)
· 1987 ~ 1996. 한국생산성본부 정보화사업부 책임전문위원
· 1998 ~ 2002. 호남대학교 교수
· 2002 ~ 현재 한세대학교 교수
· 관심분야 : 정보전략계획수립, ERP, 정보시스템 감리 등