PROGRAM MANAGEMENT STRATEGY FOR THE MaCC PROJECT

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ABSTRACT In 2006, Korean Government decided to relocate the several Government bodies and public institutes. They include total of 49 central Government agencies, semi-government agencies, and 17 national research institutes. The completion of the relocation program has been set to be final in 2030. The target population for the city plan is set to be 500,000. The goal of MAC is first to complete the first phase of the program by 2014 within the budget. In order to achieve the goal, considerable time has been spent to properly establish the program management system. The success of MAC's Multi-function Program Administration System is too early to determine as it is still in progressive. The success depends on the operations not the development.

Keywords: Program Management; Project Management; Mega Projects; Planning

1. INTRODUCTION

1.1 The Background of Government Dispersion Arrangement Policy

The capital city of South Korea, Seoul, has 600 years in history. After the war in June, 1950, for 50 years, Korea had maintained high economic growth. However, the fast growth resulted in negative influence by increase in population and the economy concentration in Seoul and Kyunggi Province, which are Seoul outskirts. The capital city and the surrounding area only take up 11.8% of the land and yet the population is over 48.5% of the whole country. If this trend continues, it is predicted that by 2011, the population in the capital city and the surrounding area will exceed over 50% [1].

Therefore, the Government proposed a policy to spread the concentrated population and the economic concentration from the capital and the surrounding cities. Without depending on the use of marketing, it was decided that through the Government policy, ease the high population and balance the development between the suburban cities and rural cities. However, in order to induce the dispersion the population and economy, it was anticipated that the Government headquarters and the public institutions would relocate. But, with the private corporations, to avoid any artificial relocation, it would be up to the market situation.

1.2 Government Agency Relocation Plan

In 2006, the Government decided to relocate the several Government bodies and public institutes as shown at Table 1. They include total of 49 central Government agencies, semi-government agencies, and 17 national research institutes. The completion of the relocation program has been set to be final in 2030. The target population for the city plan is set to be 500,000.

Table 1. Government Agency Relocation Program

Items	Target Contents
Government Agency Relocation Plan	- Total 49 Agencies(Central Government 18), 10,000 employee - 17 National Research Institutes, 2,500 employee
Relocation Time Plan	- Central Government:2012-2014 - Research Institutes : by 2012
City Scale Plan	- Population 500,000 - Population Density :300-350 per hector - Total Area: 72.91 km² - Combine with Academia, Research Institute, Culture & Global Society, State-of-Arts Technology Complex
Capital Cost Plan	- Central Government Funding:$8.5 billion *Excluding Developer and Private Costs

1.3 Construction Goal

The Korean Government is to build the city, MaCC, which will be the world class city by 2030. The MaCC, the planned goals can be described by four characteristics.

The first goal is to make it the mixed city, where it will be self-sufficient when it comes to the public. To have the mixed as well as to be self-sufficient city, it will be comprised of six complexes; the central Government organization complex, the municipality complex, the global and cultural society complex, the state-of art technology complex, education complex, and medical and welfare complex.

The second goal is to provide a city that is for the people. Here, the concept of "barrier-free" has been adopted, where for elderly as well as the physically handicapped can travel without any barriers. Also, it is designed so that people can always walk safely on the streets.

The third is to build a city that is environment friendly. The percentage of parks and greens will be 50% of the city which provides higher green space more than 37.6% of Putrajaya, Malaysia, and 32% of Dama New Town in Japan. The population density will be less than 300 people per hectare. Although it is more than 273 people per hectare in Putrajaya, but it is designed less than 357 people per hectare in Dama New town. Taking into consideration that the average population density in new cities is 600 persons per hectare in Korea, it will have considerably comfortable environment.

The fourth goal is to construct the advanced culture and information city. When new cities are built in Korea, they generally use 'ubiquitous city, u-city' concept. The MaCC is set to adopt the whole concept into the construction program.

1.4 The Time and Cost Plan for The Construction Program

It is decided that the construction of the MaCC is broken into three phase. From the international design competition to the completion of the third phase construction, it is estimated to take 25 years. In accordance with the 2003 market price, the total cost of the program is estimated US$46.5 billion. As shown in the figure 1, the central Government finances US$8.5 billion which will be used to purchase the land and the compensation for the existing business licenses. One of the public agencies, K LAND will invest US$14 billion to develop the site and to construct the infrastructure. The target budget of the private capital of US$24 billion will be used to build residential and other commercial buildings.

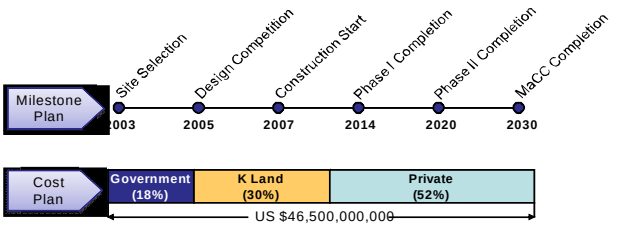

Figure 1. Time and Cost Plan

2. THE ROLE AND RESPONSIBILITY OF THE PROJECT MANAGEMENT

2.1 The Project Management Knowledge and The Application System

The general knowledge and the application system of the project management have been mainly adopted from the content of the Project Management Body of Knowledge (PMBOK) and The Standard for Program Management by the Project Management Institute, PMI in the United States [2]. However, the management process, the design and the construction process in the construction program reflect the local practice, the system and the legal requirements in Korea.

The basis of the application practice is from the past experience in the mega program in Korea such as Kyung-bu high speed rail, Incheon International Airport and other projects those were over US$1 billion.

2.2 The Case of Project Success and Failure from The Mega Projects

The success of the construction project occurs when the final project produces the quality facility within budget and on time. It is generally conceived that the larger the project, the success rate lowers. Larger scale projects tend to have difficulty to succeed, however, if it succeeds, the benefits for proprietors and the people involved will be greater in proportion to the project scale.

In Korea, there were many cases in large scale projects where the work delayed more than 50% and doubled cost. In the cases of US$10 billion projects, 1% of failure can cause US$100 million in damage. Therefore, the importance of the project management is greater where the project scale is lager and the longer construction time.

Several lessons could be learned from the successful cases of the larger scale projects in Korea and in other countries. First, the construction process management and the business management are the governing factors rather than the technology in the success and the failure of the construction projects. Second, it is evident that the earlier planning and the management of the project, higher the success rate. Third, selecting qualified person and organizations from the early stage of the construction regardless of the size of the project are also important.

Also, there are several lessons which could be learned from the failed cases. First, failure cases have one common aspect. It was found that those failed cases did not establish the clear target for the management and the process from the early stage of the project. Second, the goal of the management was not set clearly in the early phase. The project stakeholders did not clearly give the construction time, cost and the quality of the management goal, although they are definitely needed. Third, in the construction industry, the primary players are widely spread. Therefore, the integration and communication among the suppliers are more important than other industries. However, failure cases have tendency to lack responsibilities in design and the construction as well as the integration and the communication between the service providers. There were a lot of re-designing and re-construction.

2.3 Causes of Project Success and Failure of The New City Development Business

There are big differences between road, rail or international airport construction projects

Followings are the characteristics of the new city development business. First, the project scale is large and it takes long-term. Second, the licensing and permit authority will be the govern factors in the success and failure of the business. Third, depending on the main goal of the project, it'll be the decisive factor in providing capital resources. Fourth, there are various stakeholders and yet to construct the multi-complexes. It is more importance on the communication among the various stakeholders to control comparing to other industries.

The reasons for the high probability of failure in new city development business is first, there is the emphasis in which the Agency wants to converse too many new technologies into the city administration service implementation. Second, the problem occurs when they cannot attract the private capitals for the city which results considerable time delay. Third, there is the power struggle between the local Government and the central Government, which results in the delay in the review and approval process.

2.4 The Selection The Project Management Method

As the industry develops, there is the greater trend to provide various construction products as well as complications. Increase in financial profits makes the high expectations from the stakeholders, which they insist on higher quality end product with the lower cost. And it is clear that city developments and the mega projects have tendency to become larger in scale. There are no longer individual business projects but mega projects. There is an expansion in the program management which ties the project management and individual facilities. The world renowned construction magazine, Engineering News Record (ENR), started report the ranking of the program management from 2002. It implicates that most of people do not understand the differentiation between the project management and the program management.

However, project managements such as city construction, rail system and other larger scale projects that targets individual facilities, due to the need to have one specific goal, a super ordinate concept in the project management have been introduced in the program management. Recently, there is an introduction of project management, program management and portfolio management, which is a relatively new concept. This is because the size in which the project management has expanded and the need to divide the roles has been raised.

Final decision has been made in construction of the MaCC where the characteristic of the construction program has been taken into consideration in figure 2. In Korea, program management has already been used in projects such as the Kyung-bu high speed railway and Incheon international airport construction program. In particular, the US$12 billion project of the Yongsan US Army Relocation Program, YRP, has already decided to use the program management so from the viewpoint of MAC, the application of the program management for MaCC program is optimum choice. YRP started 3 years earlier than the MaCC program, it was a good benchmarking target to follow.

Although the program management hierarchical structure has been selected, the selection of the role and responsibility will be determined after further research. For consultation purpose, MAC requested to analysis the issues to the Construction & Economy Research Institute of Korea, CERIK. Upon the request from MAC, program management strategy has been developed by CERIK.

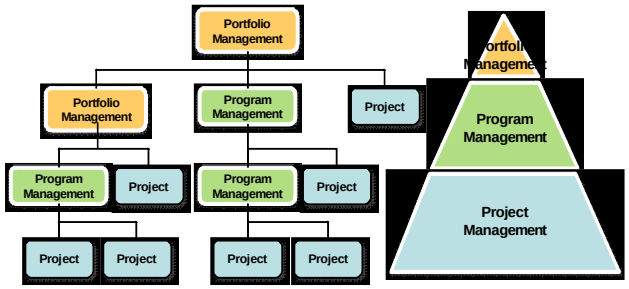

Figure 2. Project and Program Management Hierarchy

3. DEVELOPMENT OF THE PROGRAM MANAGEMENT MASTER PLAN

3.1 Necessities and Background

In order to precede the project, it is important to plan enough ahead. Even though it is important to plan from the initial stage, in reality, the execution of the pre-planning is rare. According to a survey from a consulting firm of the United States, in 2005, more than 60% of the participants emphasized the importance of executing the pre-planning in construction management. It was also reported that despite the importance, in reality, there were only 47% of projects that planned before starting the project [3].

The reason of the strategy development for the project management prior to the commencement is equally as important as having a preliminary design criteria package is needed before design start. Without the basis for the design criteria, it is impossible to start design work. So, without the prior strategy for the project management, it is likely that problems would occur while the project is in process and cannot be altered. Also, it can be assumed that the alteration of the project management system tend to lead the project to fail rather than to succeed.

3.2 Relationship Between Mega Projects and The Strategy Development

As the scale of the project expands and amount of people involves in the projects is large, in relations to the importance of the role and responsibility, it proportionally increases. The need for the project management strategy can depend on the Clients or the Owners' experience, knowledge, and whether or not they have the responsibility in the project.

If the Clients or the Owners invest on construction projects consistently, the need for setting up the project management strategy lessens. Most Owners already have the project management system. However, if the new project is different in size or if it's a new project, then it is different environment. In this case, they need to develop a project management strategy.

In the case where there is no responsible organization for the project management and the project cannot proceed without the knowledge of the general project management, before the commencement of the project, the project management strategy is definitely needed. In the past, there were a few mega programs which the project management strategy were operated in Korea. One can find at figure 3 as an example.

Earlier the PMP development completes the more advantage it has. From the Writer's experience, once the feasibility analysis is completes, the PMP development should commence which will have higher success rate in the project management. Incheon International Airport is seen as the international model example among the other international airports in the world. The Writer considers that one of the reasons for the success of Incheon Airport program was utilizing properly the PMP. The relocation of the US Army base which is undergoing in Korea at present time, execution of the PMP development was delayed which is causing some problems in cost and time.

In the case of the Nuclear Power Plant in Korea is larger in scale and more complex than the Incheon International Airport construction. However, the Owner already has consistent project management and a structured project management system and he does not need the new project management strategy as they already have many experiences, knowledge and dedicated project management organizations with the project management system.

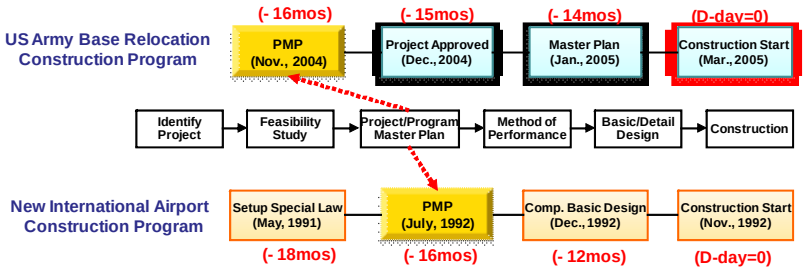

Figure 3. Program Management Master Plan, PMP [4]

3.3 Relationship Between Projects Management Strategy and System Implementation

The PMP is applied in as the baseline to the project management system development. It is the same theory as having the design criteria in the engineering analysis. PMP could be revised during project management system development process. Generally, business where the PMP is required to be developed, the Owners have less professions and low competence. Most of mega projects employ the project management consulting firms separating from PMP development.

If the Clients or the Owners lack in PM knowledge, organizational responsibilities and experience it is advantageous to selects the project management consulting firm where they can clearly direct their demands. Also, for the project management consulting firms, they can clearly understand the project management requirements of the Clients/Owners prior to bid. For the development of the PMP and the project management system, it is better to separate the PMP and the project management system.

4. PROGRAM MANAGEMENT MASTER PLAN DEVELOPMENT

One of the most important task in the PMP development is the analyzing the goal and the execution of the project management. In case of MaCC construction program, the Client is the Government Agency where it was created separately as one of the central Government Agencies. The reason for MaCC construction program is that the scale of the program is so large and there are various business bodies, and yet it was necessary for the Government to control the program.

The Government created the organization called 'Multi-function Administrative City Construction Agency, MAC, dedicated solely for the MaCC construction program management. The MAC organization is comprised of people selected from the various central Government organizations. Although the purpose for the MaCC construction program was clear, the MAC Agency was unclear of its purpose. Because it was not ready to manage and did not have the environment for the organization as the Agency was created swiftly.

As a result, MAC has decided to hire the outsource to develop the program management master plan strategy. MAC named Construction & Economy Research Institute of Korea (CERIK), as the PMP developer as they are well known to have good knowledge and experience internationally both in construction management and project management arena.

The goal of MAC is first to complete the first phase of the program by 2014 within the budget. In order to achieve the goal, considerable time has been spent to properly establish the program management system, which was needed. The Government initially planned to give the construction program of the MaCC to the semi-government agency, K LAND. However, from the research results by CERIK, K LAND's capability and the

role was limited to infrastructure construction program. Therefore, the Government decided that the role and the responsibility of MAC had to be bigger than the Government's initial plan and also it was recommended to upgrade from the level of the project management to the program management.

4.1 Project Environment Assessment

Prior to develop the project management master plan, it is right procedure to start the research on the project management target and management environment.

First, it needs to analyze the physical scale, timeline and cost of the program. The MaCC program is the biggest project in progress in terms of the cost and the size of the construction project in Korean construction history. It was reviewed that there was a need for the program management system unlike other previous projects. In particular, since the total cost for the program is over US$46 billion, 1% of failure can cause additional cost US$460 million, so it is critical to manage the cost of the program management. And also, considering the annual average 3~4% inflation rate in Korea, one month delay can cause US$130million additional cost to the total budget.

Second, the MaCC construction program location is approximately 130km from south east of Seoul. It has an easy accessibility from Seoul. Research was conducted to review the geographical location and the accessibility of the construction materials, human resources, site logistic system, construction temporary infrastructure. It was found that site the logical system could not be any problems during construction program execution.

Third, MaCC construction program was analyzed to assess the inner organizational attributes. MAC's goal is to construct the world class city and also to be amenity at the same time. To enhance the city convenience, MAC adopts to build the "u-city" which is the high-technology information city. It is predicted that individual facility would have many intervention matters to meet integration requirements of u-city.

The information synthesis within the individual facility must be created to make sure that it can be workable in the city administrative operation system together. Although once the individual facility is finished, it should be synthesized to a single information system. During construction phase, it would have considerable amount of interfaces between the site development and infrastructure. MAC must handle the interfaces between individual facility and infrastructure.

Fourth, assessment of the organizations such as MAC and other organizations involved in the program and the Government Agencies. Due to the scale of the MaCC construction program, there are many organizations involved in the program indirectly. There are estimated to have 55 organizations including the central Governments and the Agencies (refer to figure 4). The larger the number of organizations involved in the project, the more invention matters increase relatively. Especially, as the program received the one of highest attention from the President, the government bodies and agencies were to be highly involved. For MAC in turn, the managing the intervention matters were burdening.

According to the results from the assessment, MAC has to confront everyday with four other organizations 365 days a year. Thus, in order to manage more systematic manner, the program management master plan and system were definitely needed.

Fifth, assessment was conducted so that to what extent the MAC could be able to take charge the role and the responsibility in the Program Management in terms of organization. By the organizational assessment, MAC's organizational structure must be revised to accommodate both function of program management role and Government role.

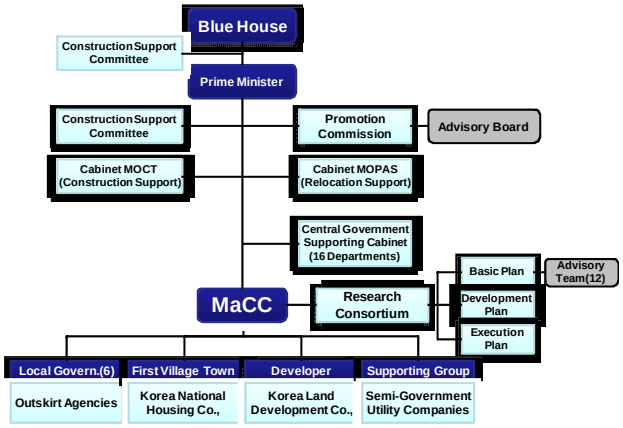

Figure 4. Organizational Environment

4.2 Program external constrain assessment

Assessment was conducted on the program external constraints. The MaCC construction program has a wide spread program in terms of the size and the scale, so there are a lot of individual facilities that were needed to be managed. It came to the conclusion that the Client or the Owners have to manage the individual facility. However MAC organization itself is concluded as an ineffective organization to handle two independent functions. So the results of assessment recommended that the role and responsibility of MAC should be like the control tower in the airport where it oversees and manage the entire program.

From the analysis of the affordability in the total cost and the project management, the results showed that the program management had little leeway. Since the total cost had considerable uncertainties in the total cost, the results was that there should be more emphasis on managing the total cost rather than the construction duration. In order to manage the capital cost more effectively, the program management master plan has to be developed and supervised systematically. In particular, the private investment must be detained 52%, the public finance must have the significant reliability and accurate management.

4.3 Project Internal Constrain Assessment

In the organizational environment, MAC has two functions and roles at the same time. First, the role as the Government Agency, it has the authority to review and

approve any issues those may be raised in the MaCC construction. Also, it has the other role as the program management. For the Clients of the construction project, having the authority and the grant in a single organization is contradictory itself. So it was concluded that MAC had to have a structure where the organization can handle the roles and the functions as the Government Agency and the Program Manager.

The extent to which the Program Manager, MAC should manage the program from the beginning to the end by assessment. However, there were found a problem as in order for one organization to perform all the tasks, it was too heavy and too much. Therefore MAC has to reinforce human resources in one time for only one program. But it was concluded to be inefficient. So to resolve this problem, MAC, the Government Agencies and the individual Contractors must share the roles and responsibilities among them. Even though the dispersion of the responsibilities, the control tower has to operate properly, it is necessary to have hierarchy organizational structure to be compatible with information system. To obtain the compatibility of the information system, Work Breakdown Structure (WBS) and the unified identification number for the separate information must be introduced in the program management system. For the compatibility of the information system, MAC has to impose compulsory requirements that all the Contractors and the Agencies have to meet MAC identification system. These requirements would be appeared in the all the participant contract.

The capability of the role as the program management oversight control tower, which is the responsibility of MAC, was assessed. As result, MAC had enough capability to execute tasks as the government administrative activity, no other additional reinforcement was needed. However, the program management oversight ability had problems in regards to both quality and quantity. The MAC employees were only able to spend 40% of their time to the program management task, there were serious problems with man power shortage. And also, in terms of the project management capability to exert to properly manage program, there were severe deficiencies such as the expertise and experience. Their capabilities were found no less than 70%. A drastic reinforcement was immediately needed.

5. ASSESSMENT RESULT AND THE OPTION OF MAC

5.1 Summarization of Results

The results of the assessment can be summarized as follows.

First, the role and the responsibilities of MAC must be properly shared among the public agencies, the private investor group, and the contractor group.

Second, although the responsibilities may have been distributed, it must develop project management system to ensure consistency and systematic.

Third, in order to exhibit the role of the program management oversight control tower, which is responsible for MAC, they need to have employees from the organization as well as those who have both the expertise and the experience in project management professions.

Fourth, , in order for MAC to resolve problems, it takes considerable time and expenses.

5.2 Alternate study

Table 2 shows the alternative plans for MAC in accordance with the assessment results. The first alternative plan has the advantage of completing within the budget set by the Government. However, in order to have all the internal capabilities, it would be to take minimum of 18 months of time to be educated. But for the education, another human resources are needed which was severe burdening. Although it had the advantage of having the role and the function of the Government in the organization from the beginning, it also had the disadvantage of time limits and human resource.

The second alternative plan was to delegate the responsibility to the semi-government agency, K LAND in charge of the program management of MAC. It could have been an easy choice if MaCC program was like the other new cities which had been completed in Korea.

However, K LAND was required to build the roads, the utility lines, and site development. For K LAND to be as the program management oversight control tower, there needs to be another development of the program management system. Also, it may cause some pressure on the fact that the semi-government agency having to control the central Government body.

The third alternative plan is to hire the PM Consultant firm from outside using the additional budget. The PM firm would already have the knowledge and the experience in project management and have the program management system. Although a lot of efforts can be done within short time, the fact that extra budget can cause problems. However, the third alternative plan has the great appeal that MAC can separate the Government and the program management oversight functions.

5.3 MAC's Choice

Out of three alternative plans provided by the research institute, MAC has decided to go with the alternative plan 3 for the following reasons as shown at figure 5. Although CERIK suggested the best plan, the final decision should be made by MAC.

First, MAC has concluded that it is impossible for them to develop the system internally. They lacked experience in the project management, and also they were considerably deficient in the expertise. So due to the tremendous responsibilities and pressure, they could not choose the alternative plan 1.

Second, MAC concluded that K LAND does not have the capacity to develop the program management. In particular, for K LAND to intervene issues raised by the central Government, they were in the lower position.

Table 2. Alternative Plans and Comparisons

Classification	Alternative Plan 1 Strengthen the Internal Capabilities	Alternative Plan 2 Commission K LAND	Alternative Plan 3 Employ PM Consultant
Advantage	- No additional budget - Easy to identify culturally	- Low probability in margin of errors as it is similar to the other new city developments	- Compensate the limited human resources. - Able to have the people with expertise and the experience - Less margin of error in the develop and execute Project management system - Able to separate the role of government and the project management
Disadvantage	- Estimated time due to the strengthening the Capabilities, at least 18 months - Due to the limited time, unable to obtain. - Can only provide education due to the lack of human resources. - Unable to develop program management system internally	- Can cause problems with the existence of MAC - Lack of experience in the development of building and city management system. - Weak to manage the central government bodies.	- Additional budget needed - Need to introduce program management different to government administrative management

Third, MAC did not enough time to develop the system or to equip with the capabilities, so that was the deciding factor for the alternative plan 3. Also, it was taken into consideration that in reality, MAC cannot be expanded further.

Once MAC decided on the alternative plan 3, MAC requested CERIK to study the development criteria of the program management system, the total budget needed to operate the program development, and on the tentative organizational structure. Also, MAC asked CERIK to prepare the Request for Proposal (RFP) to select the professional agency.

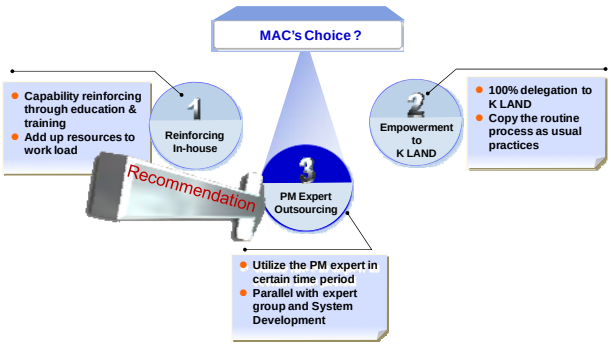

Figure 5. Alternative Study and Recommendation

6. PROGRAM MANAGEMENT DEVELOPMENT CRITERIA

6.1 Purpose of The System Development Criteria

In order to ensure the roles, functions and the responsibilities of the PM consultants clearly and in legally, in the RFP, those needed to be clearly stated in the contract. The role and the functions of MAC needs to be stated in the proposal in relations to the program management so that it allows the PM consultants to have the opportunity to review their capabilities prior to contract.

The basic requirement for the development of the system is that the information on the program management, management level, as well as the information on the synthesis must be included in the program management. Also, for MAC, the program management system structure must include the three elements; procedure, organization and the human resources, and the computer program. MAC had been clear with its demands in the RFP.

Although the program management system has not been labeled, MAC was clear about the obtaining the information compatibility between the agencies and also the system must execute the functions and the roles of MAC. And MAC needed to impose responsibilities to the individual organizations so requirements would be included in every contract condition.

The main goal of the system development criteria was to have MAC's demands clearly stated in the contract so that the professional agencies can take into account on the time and the cost when submitting the proposal.

6.2 Program Management Structure and Role Assignments

For the professional agencies to understand the limits on the roles and functions of MAC in the program

management, it is necessary for them to understand the functions and the roles of the program management accurately. Therefore, as shown in the figure 6, the role of MAC is under the oversight management as the program management oversight control tower. Also, the program management comprised of K LAND and other agencies working on behalf of the Government have the direct relations with the program management, comprised of the individual Contractors, so it can be seen that their responsibilities are needed to be stated clearly.

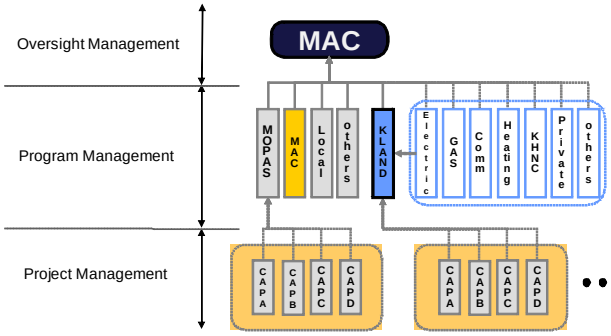

Figure 6. PM Structure and Role

Although the role of the control tower is very similar to the program management, but in terms of the depth, there are differences. For example, for MAC, managing time is important to manage the milestone, so to make a difference; K LAND needs to develop the CPM schedule to manage time.

6.2 Program Management Master Plan

MAC does not need to know the functions and the roles to operate in the organization in the PM professional agency, however, they need to understand the basic organizational structure to implement as the program management oversight control tower. So, MAC roughly stated the organizational plan in the RFP and induced the candidates to submit the organizational plan in accordance with the condition stated in the RFP.

As mentioned before, the organization of MAC must function under the Government and have the role of the program management so they will have the different concept when compared with other projects in Korea. The proponent can change the program management organization to make more effective program management oversight control tower. The changes proposed by the proponents can be evaluated and scored on the judgment.

6.3 Multi-function Program Administration System

First, for the execution of the role of the program management oversight control tower in the MaCC construction program, MAC has labeled the project management system as “MPAS(Multi-function Program Administration System)”. The reason for labeling it is shown in figure 7. It shows that the various organizations participate in the program and to separate the project management system obtained by the different organizations. At the same time, through the MaCC construction program, MAC’s goal to compete with the other nations’ new city development in program management area.

The commissioned PM instructed MAC to follow the procedure shown in figure 7, so that the MPAS can be developed. Although it was not compulsory, MAC insisted on following the procedure so that they could reflect the demands laid out by the PMP. Generally, the normal procedure is to develop the computer program, but the Consultant designed the program management process, and then developed the computer program. Also, the Consultant had proposed the program organization and number of required human resources to implement MPAS after development.

PMP also stated the five elements that had to be obtained by the computer program. First, once the master plan has been established, then the simulation must be possible and the K LAND and other project management programs must be compatible to exchange the data

Second the need to obtain the sufficient control functions where it can readily analyze the deviation between planning and actual. MAC should be able to look the current status on the program anytime and MAC must forecast the potential problems before happening.

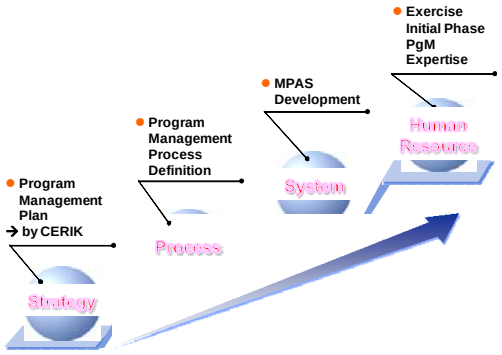

Figure 7. MPAS System Development Process Requirement

Third, the MPAS should be able to manage interfaces among the participated organizations. To manage the interfaces, any meeting in regards to program management, all the schedule and cost changes must occur within the MPAS platform. The meeting agenda in the MaCC program must be produced through the MPAS, and any time and cost related issues in the MaCC program must be based on the MPAS.

Fourth, all the progress report must be produced based on the data of the MPAS. To have all the information of the current status were pipelined to the MPAS. This shows the importance of the roles and the functions of the MPAS. Particularly, it was strongly recommended that all the Parliament and Government reports must be from the MPAS data.

Fifth, the Korean Government has the national administrative computer program. It is recommended for the MPAS to be able to communicate with the national administrative program data.

7. CONCLUDING REMARKS

7.1 Lessons Learned from Program Management Strategy Development

Comparing to the program management system development in Nuclear Power Plant construction project, program management system development in the High Speed Railway construction program, and program management system development in the International Airport construction program, PMP for the large scale New City construction program has several differences.

First, full co-operation is needed from the central Governments and other organizations from the local Governments. At the same time, co-operation from the Government bodies would have considerable affects on the MPAS implementation. Also, semi-government Agencies and public Agencies are involved in a various levels. In particular, having the semi-government agencies obtaining the project management system compatibility in a large scale construction project is very few.

Second, there are few people aware that implementing the PM system needs more attention and more cost than the system development.

Third, the PMP is representing MAC's program management functions and roles as its program management strategy. The primary education program about the basic knowledge of the program management to MAC employees was provided approximately 180 hours by CERIK. It was very useful for MAC to understand MaCC program management function.

Fourth, PM consultant, who fully understands the goals and the information on PMP, is selected, and then successfully developed the MPAS. MPAS would likely be the bench marking target as the best practice model in Korean new city development programs. It is predicted that the MPAS would also be bench marked globally.

7.2 Conclusion

Although the PMP development needs efforts and considerable amount of time and budget, it can be compensated by its effectiveness. The total cost of the MaCC construction program is US $46 billion, if there is an increase of 10% then it would be US$4.6 billion. Although it takes time and the cost, its impact is immense. In particular, recently the project sizes become larger and more complicated. The success does not depend on the technology but the planning and management and the process design. A CEO from the one of the world's most competitive construction firm has stated that the 80% of the problems of the construction industry are not from the technology but the process, which again emphasizes the importance of PMP.

The success of MAC's Multi-function Program Administration System is too early to determine as it is still in progressive. The success depends on the operations not the development. Now, MAC's MPAS has completed the first stage of development and is proceeding to implement. The success can be determined at least one year after implementation.

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