A Full Life Cycle Project Management Method for Military Enterprises

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Abstract. At present, military enterprises usually adopt empirical project management method to implement project management. The management efficiency is low, and the phenomenon of scope spread and arbitrary change is common, which seriously affects the efficiency of project operation. In order to improve the efficiency and maturity of project management, according to the background and characteristics of military enterprises, this paper has tailored and adjusted the Project Management Institute (PMI) modern management methods, and designed a set of life cycle project management methods suitable for military enterprises. It is of great significance to enhance the efficiency of military project management, improve the controllability of project risk and ensure the smooth operation of the project.

Introduction

Project management plays a unique role in enterprises and individuals to cope with the crisis, and has gradually become a new way for enterprises to cope with challenges. The level of military project management is of great significance in ensuring the success of military projects [1]. Since the end of last century, military enterprises have been introducing various related management policies. However, due to the limitations of military enterprises, military project management has not improved significantly. The project management office of military enterprises generally adopts the empirical project management method [2] and there is no clear project management system and standard. The risk identification consciousness is poor and there is no priority in the process of stakeholder management, which seriously affects the normal operation of the project. Meanwhile, it is easy to cause irreversible losses due to the lack of key stage gates setting, such as the phased achievements acceptance. During the whole life cycle of the project, changes of plans, nodes and so on are arbitrary, and there is no clear change process to restrict them that the results may not match the plans. Sometimes when change opinions are put forward by the clients, the changes are implemented immediately. Such control loopholes may cause serious spread of project scope, delay of schedule and increase of cost, which seriously affects the success of military project. Therefore, scientific and reasonable project management is of great significance to military projects.

Combining with the current environment of military enterprises, this paper deeply considers the effective measures to promote project management methods in military enterprises. The PMI modern project management method [3] is complex, the number of documents and tools is large and the requirement of agility is high. In military enterprises, few project managers have accepted professional Project Management Professional (PMP) qualification certification so that the communication in work by using professional knowledge and terminology is difficult. It is even more difficult for modern project management methods to be accepted as a general management process. Therefore, it is obviously inappropriate for military enterprises to apply professional methods blindly. Based on the PMI modern project management method, this paper designs a full life cycle project management method suitable for military enterprises.

Full Life Cycle Project Management Method

The full life cycle project management method is divided into five process groups: initiation, planning, execution, monitoring and closing [3]. According to the customer characteristics and
project characteristics of military enterprises, 49 sub-procedures and the documents of PMI modern project management method are tailored and adjusted. On the basis of ensuring the normal operation of the whole process, the types of project management documents and project documents can be reduced. Meanwhile, the process complexity can be simplified to make it conform to the military enterprise system and then improve the project management level.

Initiating Process Group

The initiating process group mainly includes the development of the project charter (if Party B, the project charter is based on the statement of work, referred to as SOW) and the identification of stakeholders.

Develop Project Charter. The release of the project charter marks the formal establishment of the project. The charter defines the objectives and the success criteria of the project, and authorizes the project manager. Because of the special role of project managers, their business ability does not need to be professional, but to be comprehensive. Project manager should be familiar with scientific research procedures, and should also have the leadership to cohesive team and promote the project. Selecting a good project manager is an important prerequisite for the success of the project.

Identify Stakeholders. During the project initiation phase, it is necessary to identify all persons, groups or organizations that can influence or be influenced by the project, and to collect basic information and evaluation information of stakeholders, such as name, position, project role, contact, power, interests, attitudes, major requirements and potential impact on the project. Then a stakeholder register is formed to facilitate the management of the reasonable participation of stakeholders in the project.

Planning Process Group

With the largest number of sub-procedures, planning process group is the most complicated process group in project management. It is considered in PMI that planning and controlling is of great significance to the success of the project. The plan process group mainly formulates a series of project management plans to explain how the project will be implemented, monitored and controlled.

Plan Scope Management. In order to achieve the project objectives, first of all, project managers should dock requirements with stakeholders, dig their deep needs and potential needs, and form a requirement tracking matrix. Then, the collected requirements should be reviewed to identify which requirements are included in the scope of the project and which are excluded from the project. A project scope statement, which is an important basis for project implementation and acceptance, is generated to clarify the project boundary. If changes are involved, the changes should be added to the change log. Afterwards, a Work Breakdown Structure (WBS) is formulated. It should be emphasized that project managers only need to decompose WBS into work package level (if there are uncertainties, it can be defined as planning package first, and then transformed into work package through rolling planning). Activity and task level need the execute team to decompose that to ensure team members reach consensus on task level decomposition.

Once the scope benchmark is determined, it is not allowed to change at will. Unless there are special factors, the scope can be changed through the change procedure to control scope. Otherwise, scope spread often leads to in schedule delay and cost increase.

Plan Schedule Management. The goal of schedule management is to complete the project by nodes. Firstly, the activities are sequenced according to the four logical relationships in the Precedence Diagramming Method (PDM). Considering the project cost, the lead and lag are added to the project schedule network diagram appropriately to enhance the flexibility of the project plan. According to the estimation of human resource, single activity duration is obtained. In the process of estimating the activity durations, it is necessary to consider the emergency reserve and management reserve, generally taking a percentage of the total project duration. Then, the project schedule is formulated by combining the impact of the lessons-learned register and the risk register. This process
identifies the key path of the project in order to achieve resource optimization in the project management process.

**Plan Cost Management.** The goal of cost management is to complete the project within budget. In the initiation phase, analogy estimation, a method with low accuracy and low cost of consumption, is generally used to estimate the costs. When signing a contract, the bottom-up method is usually used to estimate the cost, the estimated costs of all individual activities or work packages are summed up. Adding a part of emergency reserve, the cost benchmark is established. And then adding a part of management reserve, the project budget is finally generated. Because of the long development cycle and high technical difficulty in military enterprises, the emergency reserve should be formulated as thoroughly as possible in order to avoid the emergence of budget constraints in the later stage of development.

**Plan Quality Management.** The goal of quality management is to ensure that the project or product is qualified and compliant. Most military enterprises set up quality standards office to supervise quality. However, the quality management level is still in the stage of “quality control” [4]. In order to meet the strategic requirements of modernization, the total quality management (TQM) should be gradually promoted.

**Plan Resource Management.** The purpose of plan resource management is to improve the efficiency of employees. The project team in military enterprises is generally stable which only needs to plan the configuration and responsibilities of team members. In order to avoid the problem of unclear responsibilities, the responsibility assignment matrix (RAM) or RACI (responsible, accountable, consulted and informed) matrix diagram should be formulated reasonably. The work package or activities should be linked with project team members to ensure that only one person is responsible for one task.

**Plan Risk Management.** The purpose of risk management is to reduce the uncontrollability of the project by determining the probability of risk occurrence and the impact (chance or loss). First of all, risks need to be identified and the risk sources of existing individual projects or overall projects are recorded so that relevant project team members can properly deal with identified risks. Then, by evaluating the probability and impact of a single project risks, the risk probability and impact matrix is formulated and the risks are prioritized. For quantifiable risk, the information can be generated by Monte Carlo simulation, sensitivity analysis and decision tree analysis to reduce the uncertainty of the project. For the risk that cannot be quantitatively analyzed, risk modeling can be carried out in advance. Combing qualitative and quantitative analysis results, risk responses are planned and the relevant information generated in the process is recorded in the risk register. The planned risk responses can also be quantified to further reduce project risk. If new risks or changes are subsequently identified, the risk register should be updated.

**Plan Procurement Management.** The purpose of procurement management is to achieve team goals with external support. Firstly, a make-or-buy analysis is made to determine whether outside resources are need to be obtained. If necessary, the SOW should be formulated to specify when and how products or services will be acquired. Based on the scope of procurement, corresponding contract model is selected to avoid unnecessary risk sharing.

**Plan Stakeholder Engagement.** The purpose of planning stakeholder engagement is to mobilize stakeholder participation enthusiasm and further promote project development with the help of stakeholder forces. Based on the information in the stakeholder register, the potential impact of the stakeholders on the success of the project is assessed. The participation of the stakeholders should be effectively mobilized so that the whole project life cycle will be positively affected.

**Plan Communications Management.** The purpose of communication management is to keep project stakeholders informed about the project situation. An important section of this process is to grasp the interested parts of the stakeholders and communicate the project progress and problems at the right time. If project stakeholders do not understand the project situation and change information, they may be unsatisfied with the results at project closing phase so that the final acceptance of the project cannot be completed.
Executing Process Group

In order to achieve the project objectives, the project is executed regulated on the basis of the output documents of the planning process group. For a single project, there is no conflict between projects, and the execution process is relatively smooth. For a project portfolio or program, due to resource allocation and operational conflict and other issues, project managers need to coordinate and rationally allocate to ensure maximum benefits.

**Manage Team.** In the process of team cooperation, conflict is unavoidable. Conflict is mainly caused by resource competition, interest relationship and style differences. Successful conflict management can not only improve productivity, but also enhance team cohesion and performance. Conflict management should vary from different circumstances and try to seek the most appropriate solution to achieve win-win results. During the process of resource management, according to Maslow's hierarchy of needs theory, employees' enthusiasm and creativity can be stimulated by meeting their different levels of needs. Based on X-Y theory, a relaxed and free modern working environment can be created to meet employees' self-realization needs.

**Implement Risk Responses.** When identified risk occurs, the risk register should be checked and corresponding measures should be implemented. If the response measures have not been formulated beforehand or the measures formulated beforehand are ineffective, the contingency measures will be implemented. When unidentified risk occurs, the contingency measures will be implemented according to the situation.

**Conduct Procurements.** Generally, operation departments are set up in military enterprises to deal with external affairs such as procurement. Qualified sellers are identified through tendering by the operations departments, and contracts and agreements are signed to obtain the required products or services.

**Manage Stakeholder Engagement.** Through the management of reasonable stakeholders’ engagement, the support of stakeholders will be enhanced and the resistance of stakeholders will be reduced. Stakeholder management must not be “treated equally” or “ignored”. The attention should be rationally allocated according to the power-interest grid.

Monitoring Process Group

By monitoring deviations and problems in the process of project execution and constantly changing or correcting, the project can be completed in accordance with the established objectives. When stakeholders propose change requirements, the execution team evaluates whether the changes affect the three benchmarks. If not, the change log is directly updated. If so, the changes should be reported to department leaders and experts for approval, and then the change log is updated. The change log records the monitoring situation throughout the project and helps to update and maintain the relevant documents of the project in time.

Closing Process Group

The project closure is divided into two parts, one is the contract closure, the other is the administrative closure. At the end of the project, the acceptance, delivery and transfer of funds with suppliers or customers is completed. Then the transfer within departments or organizations is completed, experience and lessons of the whole life cycle is gathered and archived, and the organizational process assets are formed as reference for follow-up projects.

It is noteworthy that stage gates should be set up for the acceptance and delivery of project results. When a stage is over, the corresponding stage gates must be met before the next stage can be entered. Acceptance of results should be carried out according to the stage, so that the inestimable risk caused by the failure to meet acceptance requirements can be prevented in the final stage.
Summary
With the urgent need for new national defense weapons and equipment, the project management methods of military enterprises need to be changed to the direction of modernization and scientificalization. The advancement of project management methods can not only affect the management efficiency of military enterprises, but also directly affect the success or failure of scientific research projects. If the military enterprise management department can audit the organizational structure and management method professionalism, it will have a positive impact on improving the project management maturity of the military enterprise.

This project management method is based on PMI modern project management method with a high maturity. Compared with empirical management, this method has obvious advantages. The planning process is set up rigorously and the operation efficiency of the project can be enhanced. At the same time, through qualitative and quantitative risk analysis, the risk controllability has been greatly improved. Unacceptable results have been avoided in the phased acceptance and the stakeholder management is also evidence-based. Through strictly documents control, this method solves the arbitrary change problems in the past military project management. Clear and concise workflow of this method is also easy to accept for staff.

References