The Applicability of Program Management Approach in the Defense Acquisition Projects in Order to Avoid Deviations

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Abstract: *Defense acquisition process contains initiatives aiming to maintain defense capabilities needed, by making use of the most sophisticated technologies under legal and financial constraints. Increasing number and complexity of those initiatives and also the necessity of developing them integratedly causes defense projects to deviate to a certain extent. In this study, following a brief discussion on the deviations of defense projects in terms of defense planning process, Program Management Approach, which may be defined briefly as managing a number of complicated projects for deriving common interests has been introduced. Following that, an alternative governance model which is based on the program management concept has been proposed, in order to manage defense resources in a more organized way. As a consequence, a number of inferences about the applicability of program management approach have been made in consideration of this research and interviews.*

Keywords: *Defense industry, Defense acquisition, Planning management model, Project management, Human resource.*

Introduction

The process of developing and procuring defence systems consists of long-termed and complicated attempts that necessitate using the most sophisticated technologies throughout the country, planning human resource, budget and the other factors together with the participation of a range of organizations. Due to the uncertainty and instability of threats, number and complexity of those attempts have been increased and it causes the defense projects and capabilities of countries to deviate more than ever. Those kind of deviations seen in the defense projects have been analysed further in the second section.

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In terms of the technological competence limits in a country and in consideration of the obligation of managing interior/exterior stakeholders' legal, technical and managerial procedures controlledly, specific management methodologies need to be implemented to reduce the time, budget and performance deviations seen in most of the large-scale defense systems projects.

In this regard, program management approach, whose standards have been set by PMI, "defined briefly as managing a number of complicated projects together for deriving common interests" is considered to contribute positive outcomes to defense sector. Thus, in consideration of Project Management Institute (PMI) standarts, offerings by program management methodology have been investigated in the third section to be able to comprehend the difference between project and program structures from an organizational perspective.

In fourth section, face-to-face interviews with the project management professionals in Turkey have been conducted by using depth-interview method to assess the awareness level of program management and infer about defense program management. After that, an alternative management model which is based on the program management structure has been proposed.

On the conclusion, it is inferred that program management approach, which is relatively new compared to project management, may be implemented in defense sector if maturity of project management culture reaches a certain level, organizational process and legal procedures are revised and inspection mechanisms provide enough convenience and authority for program managers within the aim of managing long-term initiatives from a holistic point of view.

Defense Acquisition Projects and Effects of Evolving Defense Acquisition Process

Defense Acquisition Projects in Brief

As a definition, defense acquisition projects are the initiatives aiming to provide end-users operational systems in order to maintain defense requirements under a number of constraints[1] by making use of project management procedures.

In principle, a number of factors are common in defense projects and others. Time, budget and qualified human resources stand as key elements which affect the success of any projects as these kind of limitations are also seen in commercial ones. Also, quality requirements enforce the project managers to decide the methodologies and techniques accordingly. In accordance with the fact whether system requirements could be met by the capabilities of defense industry of certain country or not, procedures may differ from off-the-shelf procurement to joint production (with another country) or indigenous design and innovative productions by country's own capabilities.[2]

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1 Moshe Schwartz, *Defense Acquisitions: How DoD Acquires Weapon Systems and Recent Efforts to Reform the Process*, Congressional Research Service, May 23rd, 2014, p.7.
2 Jessie Riposo et. al., *Prolonged Cycle Times and Schedule Growth in Defense Acquisition-A Literature Review*, Santa Monica: National Defense Research Institute, RAND Corporation, 2014, p.8.

Considering the uniqueness of purpose in the defense acquisition projects, methodologies and priorities defined by top-level responsible organisations may differ comparing to the other large-scaled commercial projects. Moreover, characteristics of systems/platforms, priority level according to operational needs and risks towards the security of country direct the officials to apply several approaches and techniques to result in a success in a defense project. Figure presented below indicates the decision phases in general followed by defense project managers in the U.S.[3]
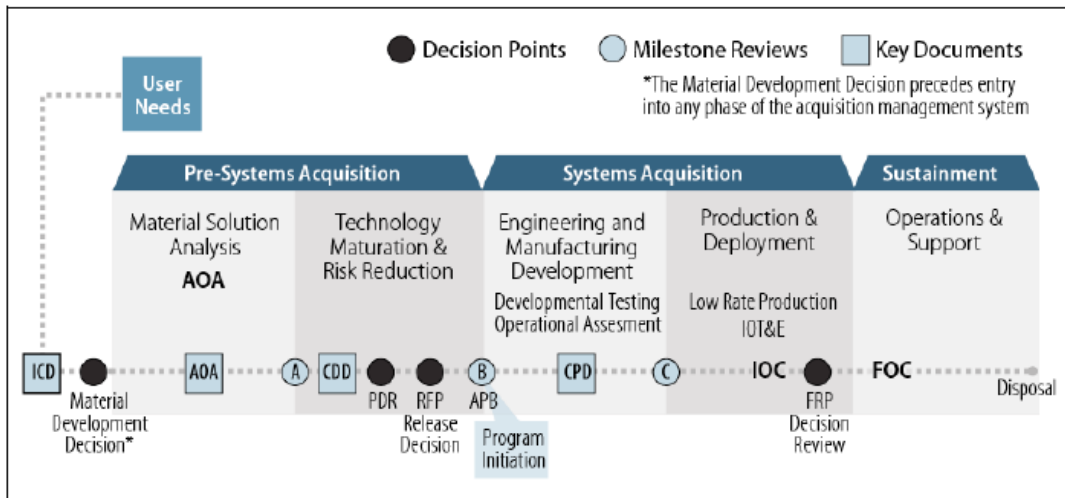

Figure 1. U.S. Decision Process for Defense Acquisitions[4]

This figure may be conceived as a basis frame for an acquisition project manager from the beginning of analysis of alternatives to disposal of a certain system/platform in theory. Through these stages, apart from common project management standards, project managers make use of a combination of different technical methodologies in defense projects such as:

- System engineering concept: Defense organisations give special importance to system engineering principles since technological expectations require integrating the components, sub-systems and systems which are already available or need to be developed. System engineering plans are used as a guide for project managers to maintain interface with other systems/projects, to define technical process, resources and measurable performance criteria for a single project.[5]

- Evolutionary acquisition concept: Since unexpected asymmetric threats keep countries acquire the most technologically-sophisticated and software-intensive defense systems in a rapid and cost-effective way throughout this century, authorities strive for having fast-adaptable and upgradable systems by evolutionary acquisition methods. Dynamicism of enemies' tools do not let armed forces design and develop a completely-new solution. Thus, spiral and/or incremental development initiatives under evolutionary acquisition approach become prom-

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3 Schwartz, *Defense Acquisitions*, p.7.
4 Schwartz, *Defense Acquisitions,* p.7.
5 *Joint Program Management Handbook*, Fort Belvoir: Defence Acquisition University Press, 2004, p.23.

inent in defense procurements by project managers.[6]

- Life-cycle management concept: A research including 29 programs of U.S. Army aiming to find the correlation between technology development costs and total acquisition costs indicates that 40,6% of total acquisition costs are created in system development phases.[7] Operational costs also constitute a significant portion in the system's life cycle. Therefore, defense project managers are expected to consider life-cycle costs of every steps (concept development, design, technology and system development, production, operational usage and disposal) by making use of long-term contracts/performance based logistics, cross-functional project teams and proactive resource planning tools.[8]

Though such kind of methodologies are applied in order for projects to be succeeded, deviations keep occurring in almost all large-scaled defense projects throughout the world. Thus, we will look into detail in the following sections about how defense acquisition process has evolved throughout decades along with the recent studies on the possible reasons of such deviations seen in defense medium.

Overview of Evolving Defense Acquisition Process

In a guide named as "Best Practices", published by U.S. Navy in 1986, defense acquisition process (from capability planning to disposal of procured systems), is defined as the most complicated technical process.[9] The instability of threats and the speed of advancing technologies enhance the level of complexity further. Defense acquisition systems include activities of managing nation's investments on technology, programs and product support and then promoting the armed forces as far as possible.[10]

Meeting users' expectations (under time/budget constraints) by improving mission capability and operational support is the main focus of acquisition process.[11]

In this context, when the acquisition process, used in the U.S. and most of NATO members, is examined, defining needs, resource planning and budgeting, developing/procuring stages are three intensively inter-related systems, given in Figure 2.

On the other hand, U.S.A and most of NATO members have chosen the capability-based approach instead of threat-based approach since 2000s.[12]

This changeover has compelled countries to choose system/platform requirements among alternatives that have been created by the analysis of capability gaps. Moreover,

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6 Richard K. Sylvester and Joseph A. Ferrara, "Conflict and Ambiguity Implementing Evolutionary Acquisition", *Acquisition Review Quarterly*, Winter 2003, p.5.

7 Brian G. Chow et. al., *Toward Affordable Systems: Portfolio Analysis and Management for Army Science and Technology Programs,* Santa Monica: RAND Corporation, 2009, p.136.

8 Nancy Y. Moore et. al., *A Gap Analysis of Life Cycle Management Commands and Best Purchasing and Supply Management Organizations*, Santa Monica: RAND Arroyo Center, 2012, p.21.

9 U.S. Department of Navy, *Best Practices: How to Avoid Surprises in the World's Most Complicated Technical Process*, March 1986, p.5.

10 U.S. Department of Defense, *The Defense Acquisition System Directive (DoDD 5000.01*), May 12, 2003, p.3.

11 Riposo et. al., *Prolonged Cycle Times*, p.27.

12 U.S. Department of Defense, *Quadrennial Defense, Review Report 2006,* 2006, p.19.
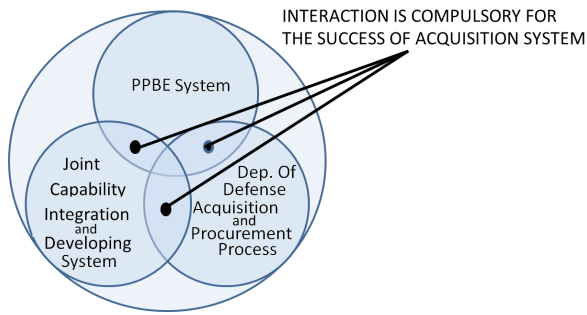
Figure-2. U.S. Defense Acquisition System[13]

it forms a basis for implementing scientific methods intensively in defense acquisition process. System engineering,[14] system of systems approach, risk management, life-cycle management and project/program management concepts are more-widely used in procurement medium, and also relation between them and contribution of procurement process have been argued recent years.[15]

A research made by RAND indicates that 85% of decisions about system life-cycle costs are made before the technology developing decision stages in an acquisition process that consists of technology development stages.[16] This fact puts forward that portfolio of projects, managed after technologies are developed without life-cycle cost concept, tend to increase the possibility of deviation.[17]

Analysis of Deviations Seen in Defense Acquisition Process

Deviations are common among development projects. A research in the U.S. shows that 40% of 21 large-scale acquisition programs deviate in terms of initial procurement cost estimates. According to same research, 50% of deviations stem from the change requests and updates on program purpose, from the beginning of projects.[18]

Considering a defense portfolio which consists 96 major defense program belonging to 2008 in the U.S., a detailed analysis of deviations has been made, as shown below in Table 1.

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13 Schwartz, *Defense Acquisitions,* p.3.

14 Office of the Deputy Under Secretary of Defense for Acquisition and Technology, *Systems Engineering Guide for Systems of Systems*, Version 1.0, Washington D.C, 2008, p.iii.

15 INCOSE, *Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities*, v.3.2.2, San Diego: International Council on Systems Engineering (INCOSE), October 2011. Josef Oehmen, *The Guide to Lean Enablers for Managing Engineering Programs*, Version 1.0, Cambridge: Joint MIT-PMI-INCOSE Community of Practice on Lean in Program Management, 2012. Walter Tomczykowski et. al., *Program Managers Handbook: Common Practices to Mitigate the Risk of Obsolescence (Draft)*, Maryland, 2000, p.2.1-2.2.

16 Chow et. al., *Toward Affordable Systems*, p.xi.

17 Chow et. al., *Toward Affordable Systems*, p.3.

18 Scott Hiromoto, *Fundamental Capability Portfolio Management: A Study of Developing Systems with Implications for Army Research and Development Strategy*, Santa Monica: Pardee RAND Graduate School, 2013, p.7.

Table 1. Analysis of Deviations in Defense Acquisition Program Portfolio in the U.S.[19]

Financial Year :2009	Year		
	2003	2007	2008
Portfolio Size			
Number of Programs	77	95	96
Total Planned Budget	$1.2 trillion	$1.6 trillion	$1.6 trillion
Uncollected Payments	$724.2 billion	$875.2 billion	$786.3 billion
Portfolio Indicators			
Change of the R&D Costs (Comparing to Start Point)	37%	40%	42%
Change of the Acquisition Costs (Comparing to Start Point)	19%	26%	25%
Total Increase of Acquisition Costs	$724.2 billion	$875.2 billion	$786.3 billion
Programs that have more than 25% increase in Program Acquisition Unit Cost	41%	44%	42%
Average Delay for First Production Delivery	18 months	21 months	22 months

According to this report,

- Research & Development (R&D) costs for programs have been increased by 42%, total acquisition costs have also been increased by 25%, compared to the initial cost estimates,

- Capability-acquiring dates have been delayed by 22 months compared to first predictions,

- Total exceeding amount of money has been around 296,4 bn. Dollars in this defense portfolio.[20]

Another research (made in the same year above) indicates that cost exceeding rates climb up to 40% on technology developing projects whereas total cost exceeding rates stay at the rate of around 25%.[21]

Time deviations have been considered less significant than budget deviations historically.[22] But a research made by U.S. Government Accountability Office (GAO) in 2012 reminds that average deviation time is 27 months among the large scale projects examined.[23]

Reasons of delays and cost exceedings bear a resemblance to each other. High technology needs (complexity of program, immatured technology, technical issues unpredicted), over-optimistic initial estimates (schedule expectations, risk, operational needs and performance predictions), budget instabilities, inter-organizational issues on integration and inability of managing inter-related projects altogether are only a few of those reasons.[24]

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19 U.S. Government Accountability Office, *Defense Acquisitions: Assessments of Selected Weapon Programs*, GAO-09-326SP, 2009, p.7.

20 U.S. Government Accountability Office, *Defense Acquisitions,* 2009, p.7.

21 Oehmen, *The Guide to Lean Enablers for Managing Engineering Programs,* p.14.

22 Riposo et. al., *Prolonged Cycle Times*, p.28.

23 U.S. Government Accountability Office, *Defense Acquisitions: Assessment of Selected Weapon Programs*, GAO-13-294SP, Washington, 2013, p.10.

24 Riposo et. al., *Prolonged Cycle Times,* p.x. Irv Blickstein et. al., *Root Cause Analyses of Nunn-McCurdy Breaches:*

Another reason is that, personnel on project management and system engineering field, employed by defense acquisition agencies and other organizations, are insufficient and less-qualified in most cases.[25] Table below summarize the causes of deviations according to a research made by RAND organisation.

Table 2. Possible Reasons of Deviations Encountered in Defense Programs[26]

Possible Reasons of Deviations In Completed Defense Programmes	
Subject of Issue	**Possible Deviation Reasons**
Defining and Managing Needs	Impossible or unrealistic expectations Changing requirements (i.e. Engineering requirements, changes in operational plans or operational environment) Inefficiencies in acquisition process (i.e. Managing needs and programming process separately instead of managing simultaneously)
Managing Technical Risks	Complexity of programmes, exceeding technical, production and integration risks Unexpected design, engineering, technical and production challenges, technological limitations Too optimistic forecasts (technical risks, perfomance targets, system requirements, maturity of design) İmmature technology Misleading in parallel processing in comlex programmes Issues in producing prototype Lack of test planning and implementation experiences Allocation of insufficient resource for test phases
Resource Planning	Instability of funds and budget cuts
Defense Acquisition Management	Lack of focusing on time constraints Schedule planning and management (Ignoring the correlations between ongoing projects and other efforts) Planning insufficient recovery budgets which do not enable to backup the project/programme initiatives when needed due to too optimistic forecasts. Too optimistic forecasts in cost and timeframe. Issues in personnel planning Competition (too little or too much) Deficiencies in contract management Performance of contractor and inadequate incentives by sponsors Miscoordination between acquisition phases
Other	Obstacles to reach the necessitated information required by relevant authority

These findings mainly assert that before initiating a defense acquisition project, it is strictly required to take into account of whole planning and capability integrating process of country since the problems faced in most cases comprise and relate different disciplines, areas of expertise and management methodologies. Thus, it won't be a realistic approach to be looking for only one solution method to overcome a great number of issues.

Therefore, considering the increase in the number of defense projects and evolving defense requirements, an overarching management approach undertaken by one de-

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Zumwalt-Class Destroyer, Joint Strike Fighter, Longbow Apache and Wideband Global Satellite, Volume 1, Santa Monica, 2011, p.xv.
25 Blickstein et. al., *Root Cause Analyses of Nunn-McCurdy Breaches,* p.1.
26 Blickstein et. al., *Root Cause Analyses of Nunn-McCurdy Breaches,* p.xi.

cision authority must be placed into defense acquisition process of countries in order to keep the total defense capabilities satisfying against the possible threats. At this stage, program management standards might provide us the theoretical knowledge on how the challenges of managing a number of projects and shareholders simultaneously could be overcome in this sector.

Analysing Program Management Approach in Theory and Practice

The Progress of Program Management Approach

Since 1960s, scheme of management which was held in a conventional way of functional units has been replaced by matrix structural units based on projects. Competitive pressure and efforts of diminishing the production time stimulate the responsibilities of high-level project managers and project teams. Further, project activities take primacy over functional units and projects have started to change the business manner of organizations.

Projects, as a classic definition, are the group of activities aiming to meet a certain requirement under time constraints and consisting the design/engineering applications.[27] As being a part of programs and portfolios, projects are usually seen as a means of reaching the targets of strategic plans and acquisition programs. Even though the group of projects under a specific program facilitates a variety of "independent" benefits, it must also contribute to strategic goals of program and portfolio.[28]

Nevertheless, it is possible to put forward that defense projects have some unique characteristics among others. In general, system development initiatives require large-scale investments and a long time frame due to high technology level. Besides, those attempts need extra measures on privacy and security issues of country.

Constraints like the need for sophisticated engineering knowledge and high level of uncontrollable exterior factors which affect project process, make the usual project management models remain incapable in some cases.[29] Therefore, it could be seen that the concepts of program and program management have been being developed because of increasing number of projects in the organizations which make use of projects as the main tool for their business.[30]

Though its initial examples are seen in following the World War II at the Ballistic Missile Systems Program in the U.S. Navy, it is difficult to say that literature related to program management has been well-established so far. However, a number of or-

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27 İsmet Barutçugil, *Proje Yönetimi*, İstanbul: Kariyer Yayıncılık, 2008, s.14.

28 Ziya İpekkan, "Savunma Planlama ve Sistem Tedariki Sürecinde Proje, Program ve Portföy Yönetimi", *Savunma Sanayii Gündemi*, 17/4, (2011), s.12.

29 Michel Thiry, *Program Management: Fundamentals of Project Management*, Surrey: MPG Printgroup, 2013, p.13.

30 Harvey Maylor et. al., "From Projectification To Programmification," *International Journal of Project Management,* 24/8, (2006), p.663.

ganizations have been leading, especially on setting standards and methodologies.[31] This essay makes use of *The Standart for Program Management of PMI,* which stands out as a widely-admitted approach.

According to PMI, program is a group of inter-related projects, sub-programs and operational activities which must be managed in a coordinated way in order to gain benefits that cannot be acquired when they are managed independently.[32] Projects in a program need to be in a relationship with each other through a common strategic goal of organization.[33]

While *D. C. Ferns* defines programs as a mechanism that manages and coordinates projects in terms of their relations among each other,[34] *Williams and Parr* uses a definition that program is a structure and process that eases of establishing the relations between the project groups and organization strategies, and also leads the resources shared and managed in a more explicit and fair way.[35]
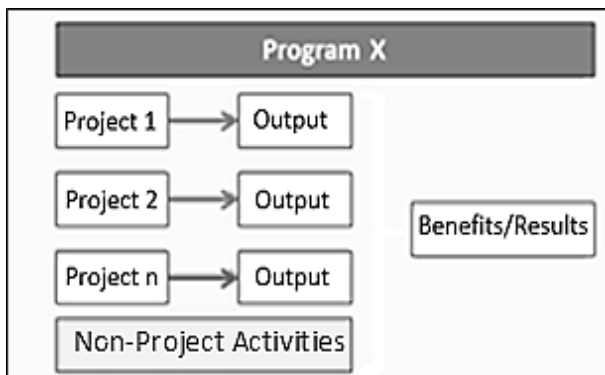

Figure 3. A Basic Demonstration of Program Structures[36]

Instead of programs, it may be more appropriate to make use of project portfolios only if the projects are not possible to join the same group with interdependent purposes to attain a common benefit and if they only use the same resource, technology or are in a relationship with the same shareholders. Programs may be classified in a number of different ways considering the number and dependencies of projects consisting of programs, performance measurement methods and scope level of programs. "Global Alliance for Project Performance Standards" defines program categories as indicated in the table below[37]:

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31 Managing Succesful Programmes (MSP) Methodology-England, Body of Knowledge Introduction to Programme Management-England, Project and Program Management for Enterprise Innovation (P2M)-Japan are the major ones.

32 *The Standard for Program Management,* Pennsylvania: Project Management Institute, 2013, p.34.

33 Dragan Z. Milosevic, Russ Martinelli and James M. Waddell, *Program Management for Improved Business Results*, Hoboken: Wiley and Sons, Inc, 2007, p.3.

34 D. C. Ferns, "Developments in Programme Management," *International Journal of Project Management,* 9/3, (1991), p.148-149.

35 David Williams and Tim Parr, *Enterprise Programme Management: Delivering Value*, Houndmills: Palgrave Macmillan, 2004, p.6.

36 Bülent E. Beyoğlu, "Teoride ve Pratikte Program Yönetimi", *Savunma Sanayii Gündemi*, 17/4, 2011, s.57.

37 GAPPS, *A Framework for Performance Based Competency Standards for Program Managers*, Version 1.1, 15,

Table 3. Program Types[38]

Program Characteristics	Program Types			
	Strategical Program	Operational Program	Multi-Projects Program	Mega Project
General Purpose	Creating benefits relevant to maintaining strategical vision of organisation	Creating benefits being critical for operational process of organisation	Maintaing synergy between projects that are common in certain aspects (i.e. Customer, resource, production technology)	Providing new capability or value to organisation
Difference	Dependent on a certain strategical and/or business goal	Main projects are dependent to each other under subject program	Main projects are dependent to each other under subject program	Larger in scale comparing to the other projects of organisation
Reason for Grouping projects	Result of a such project affects following projects	Minimising negative effects on ongoing activities	Creating synergy between projects	Necessitating different managerial implementations to handle such large-scaled efforts

Moreover, Managing Succesful Projects (MSP), a well-known program management approach by British Ministry of Commerce, offers another variety of classification:

• Vision-led programs: Program types initiated through the strategical planning process and shaped by strategical goals under portfolio management.

• Emergent programs: Program types managed as project groups after realising the fact that separately-managed initiatives may avail a common result, capability or benefit for organisation.

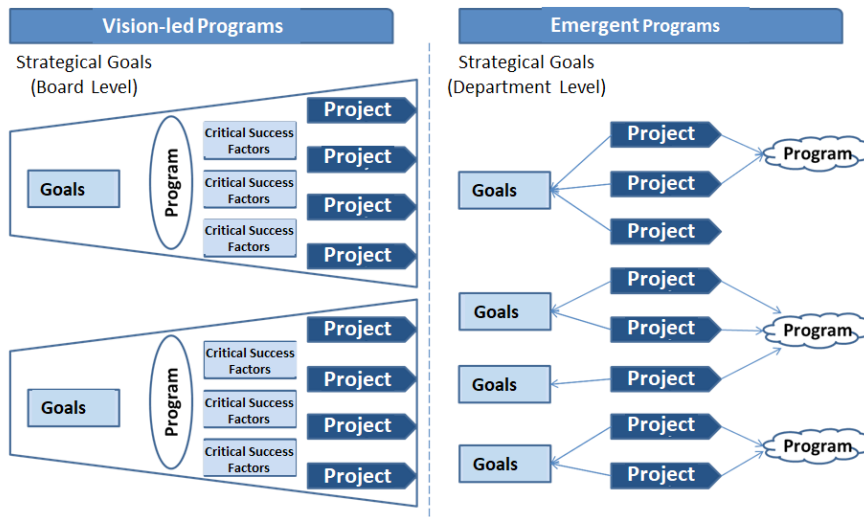• Compliance Programs: Initiated due to a legal or contractual requirements without any strategical expectations.[39]

Figure 4. Vision-Led and Emergent Programs[40]

Global Alliance for Project Performance Standards, 2011, p.4.
38 GAPPS, *A Framework for Performance Based Competency Standards for Program Managers*, p.4.
39 *The Standard for Program Management,* p.141-142.
40 *The Standard for Program Management,* p.42.

In most cases, government organisations adopt the vision-led programs in principle but emergent programs come out more in practice owing to the lack of well-established planning process.[41] In Turkey, applications in defense organisations correspond to emergent program categories mostly.

Literature demonstrates a classifying method for defense programs stemming from the past initiatives:

- Joint Programs: All/some of forces and defense agencies are the shareholders.

- Interagency Programs: Initiatives by subsidiaries of Defense Ministry and other departments/government organisations as seen National Polar Orbit System between U.S. Air Force and Department of Commerce.[42]

- Holistic Programs: Establishing the integrated program management approach by having the Government and private sector representatives.

Considering these brief explanations above, program management aims to help users define the most convenient approach to manage projects by focusing on the dependencies. Those dependencies may be in three ways:

- Result of a project affects the other.

- Projects are using the same limited resources.

- A project includes systems that may be used in the other projects.[43]

Managing dependencies is one of the fundamental responsibilities of program managers. To create a positive interaction between projects, program managers need to take the measures below at the right time:

- Coordinating and managing common program activities like finance and acquisition, finding solutions for overcoming resource constraints,

- Communicating with shareholders and informing them periodically,

- Managing program activities in order to comply with the strategical aims of the organization and exterior shareholders.

- Handling the issues about scope, expenditures, quality, time and risks of projects by maintaining temporary and flexible organizational structure.

- Leading in forming positive interfaces among the units by making use of the cultural, socioeconomic and political divergence at the most.

The main difference between program and project management is that program management concept is based on benefit management focusing on the top strategies.[44] Inter-organizational communication is as significant as the one inside the organizations.

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41 *The Standard for Program Management,* p.42.
42 *Joint Program Management Handbook*, p.47-51.
43 *The Standard for Program Management,* p.43.
44 *The Standard for Program Management,* p.25-28.

For maintaining the outcomes that lead organizations to strategical goals by using program management approach, a flexible organizational structure must be designed without any exception even in the defense organisations. In this way, a systematic, accountable and more reactive approach may be attained. A simplified example of organizational scheme including program and portfolio may be seen in Figure 3.[45]
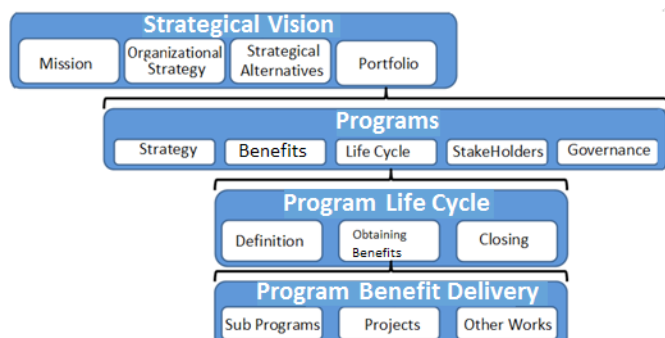

Figure 5. The Relationship Between Program Structures and Strategical Goals[46]

Responsibilities that the programs include are planning program life-cycle, identifying values/benefits, helding maintainability, defining dependencies, solving problems of different projects and contribution level of projects to the main goals of program.

Managing a number of projects under the same program framework is likely to ease of foreseeing the risks that the organization may face with. Because, a failure in a project may contribute to an irreversible problem in others; additionally, the problem may not be seen in advance at the project level.

In a well-established organizational program structure, managers are striving for adapting the projects and strategies by focusing the dependencies, proposing methods for integrating the business strategies and expected benefits. Specifically, the organizations in which a lot of inputs from diverse actors, have been faced through programs get benefit from program management office as a centre of excellence, more frequently.[47]

The Practicality of Program Management Approach in Defense Sector

Defense systems are among the most complicated projects through their scale and technological expectations. Controlling the defense projects are getting more difficult due to the need of defense units for pushing the limits of technologies to be able to stay one step ahead of the threats and protecting the national interests.[48] Thus, improving the ability of managing projects and programs, putting a corporate and program-focused structure into practice are seen as a "must" for boosting the de-

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45 "International Association of Project and Program Management Official Website", Last updated: 19.01.2015, http://www.iappm.org/concepts.htm.
46 *The Standard for Program Management,* p.12.
47 *The Standard for Program Management,* p.9, 64.
48 Christopher G. Pernin et. al., *Lessons form the Army's Future Combat Systems Program*, Santa Monica: RAND Arroyo Center, 2012, p.xxvii.

fense acquisition performance.[49]

The main difference between defense and civilian programs may be the obligation of considering the legal regulations, policies, rules and procedures more intensively than the private sector.[50] In addition, the possibility of confronting the obstacles under the sponsorship of government counted below is higher, compared to the other programs:

- Uncertainty and instability of funding medium,

- Appointment frequency of leaders and managers,

- Bureaucracy and political developments slowing down the main project efforts,

- Time limit for improving the program performance,

- Deficiency of qualified personnel.[51]

Responsibilities for parties during the defense programs: It is troublesome to define program goals that are convenient for every parties and create a common language among the stakeholders including contractors, subcontractors, users, needers, procurement officials, project teams and government officials all of whom come from a divergent background.

Figure 6. Responsibility&Coordination Cycle Between Shareholders of Acquisition Programs[52]

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49 Jonathan Kolodny, Adi Leviatan and Dana Maor, "Project Management in Defense: The Essential Capability", *McKinsey on Government*, 8 (2013), p.74.

50 John F. Schank et. al., *Learning From Experience-Lessons from the United Kingdom's Astute Submarine Program*, Volume III, Santa Monica: RAND Corporation, 2011, p.2.

51 Oehmen, *The Guide to Lean Enablers for Managing Engineering Programs,* p.23.

52 George Rebovich and Joseph K. DeRosa, *Patterns of Success in Systems Engineering Acquisition of IT-Intensive*

The matters that affect and hold to account all of the stakeholders to a certain extent from the beginning of the defense acquisition program till the end can be seen in Table 4.

Table 4. The Elements that Affect Program Stakeholders to Certain Extent[53]

Program Office Administrative Level and Personnel	Process of Preparing Proposal
Analysis of Alternatives	System Engineering
Cost Analysis Techniques	Threat Assessment
Funding Programs and Projects (Allocating Resource)	Risk Management
PPBS Process	Logistic Support
Program and System Security	Integrated Process&Product Developing
Procurement Planning	Testing and Evaluation
Contract Types	Political Dynamics

It is getting harder to determine the halting (causing deviations) point in connection with the disorder of responsibilities in acquisition process. This is another fundamental fact that leads program managers critical in a medium necessitating to handle a number of projects simultaneously.[54]

Program managers are actors for planning the organizational scheme and inspection process compatible with the projects and also connecting the project level to program board.[55] Therefore, it is expected for them to be entrusted with enough authority to manage.

Defense program managers are furnished with different missions compared to project managers. Program managers should establish closer relations with project managers and give them support one by one. Subsequently they provide integration with each program component and final destination in a correct way. Allocating resource fairly among projects, controlling the urgency of requirements and considering the budget constraints of systems and outputs in the view of life-cycle across the organization are key specialties of program managers.[56]

Due to the direct effect of developed systems/platforms to country defense, program managers are urged to do their job by means of program offices.

Program management offices are first held in the U.S. in the military departments and procurement agencies as a practice for diminishing the unnecessary correspondence and reports between decision authorities.[57] This change might stem from the

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Government Systems, MITRE Corporation, 2012, p.9.

53 *Joint Program Management Handbook*, p.15-16.

54 Owen C. Gadeken, "Project Managers as Leaders–Competencies of Top Performers" *RD&A,* 1997, p.4.

55 *Joint Program Management Handbook.* p.B.1.

56 *The Standard for Program Management,* p.14.

57 Mark Lumb, "Where Defense Acquisition Today: A close Examination of Structures and Capabilities", *Defense AT&L,* 2008, p.19.

fact that managing defense projects is getting more complex and expensive, especially since 1980s.[58]

Program management offices are expected to make things easier for program managers on actions below:

• Maintaining organizational standarts and sustaining them,

• Conveying the earned lessons after a challenge into the other initiatives.[59]

• Identifying the quality standarts and procedures through projects,

• Supporting schedule and budget management at program level,

• Analysing the risks, changes and challenges centrally,[60]

• Appointing personnel among the projects and from other sources. (fast and effective personnel planning),

• Making use of common source and capabilities throughout the project portfolios.

A wide range of organizations, especially project based enterprises struggling with project portfolios are aware of the need for program management.[61] Nevertheless, the need for authorizing program managers with serious power including spendings make the decision authority reluctant about supporting the reform of acquisition process focused on program management, just because of limiting the authorization of top-level managers.

Inspection Mechanism in Defense Program Management: Privacy and complexity of projects are among the fundamental negative factors that make the inspection process of program management difficult. Complexity of systems necessitates scientific analysis techniques through inspections, but it prevents countries from constituting those mechanisms which are expected to reduce the deviations of projects and –especially- programs, owing to the lack of know-how and number of inspection authorities which are capable of making those analyses.

Briefly, it may be claimed that inspection activities do not contribute to the concept of program management positively, in most of developing countries.

Assessment of Program Management in terms of Human Resources: The expectations

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58 *Joint Program Management Handbook*, p.7. *In "Future Combat Systems" program (being developed on behalf of U.S. Army and consisting manned-unmanned, air/ground-based manoeuvering and sustaining systems integrated with network-based infrastructures), program management offices' structure and mechanism, which have been builded up with the intention of peer-to-peer communication between army, acquisition agency and main system integrator, serve as a good example for matching up with the Program Management Standarts of PMI.*
59 North Ireland Finance and Personnel Department Official Website, Last Updated: 24.02.2015, http://www.dfpni.gov.uk/index/procurement-2/succesful-delivery/project-management/pmo.htm,
60 *The Standard for Program Management,* p.13.
61 Murat Dengiz, "Stratejik Yönetişim: Bütünleşik Proje, Program ve Portföy Yönetimi", *Savunma Sanayii Gündemi*, 17/4, (2011), p.25.

from professionals responsible for acquisition activities are getting higher due to the need for choosing the right alternative for a highly complex system among other procurement methods and preparing detailed procurement contracts[62]. Therefore, it seems not enough to employ more personnel only in number.

From the viewpoint of human resource, it is critical in major system acquisitions to employ experienced personnel continually through the program life cycle. While work experience is vital especially in complex systems, sustaining the continuity of acquisition manpower has been a big challenge due to the fact that number of professionals are not adequate comparing to the number of future projects, including developed countries. For instance,   recent research indicates that the ratio of projects of Turkish Undersecretariat for Defense Industries to number of personnel has slipped down to around 1.3.[63]

The insufficiency of both military and government personnel brings about handing over the responsibilities in projects to major and minor contractors. A research made by U.S. GAO shows that 41% of employees of program office in 61 major defense programs represents contractor firms and 26% of them are assigned to contribute to managing programs. [64]

That fact may pose significant effects on boosting the benefits of program management. Considering military, private and other employees altogether may contribute to develop a holistic and supra-projects approach by Department of Defense. This approach anticipates to take into account not only the military personnel but also the personnel and other capabilities of private agents related to programs as total capacity of program, without limiting the capacity with only military forces of country.

An Analysis of Awareness Level for Program Management in Turkey by "Depth Interview" Method

Conceptual Framework

Within the scope of research, a framework has been drawn about the deviations of defense projects and program management approach. After that, factors affecting the practicality of program management approach in defense projects have been analysed.

Going on further, gathered data have been evaluated by descriptive analysis method, structured interview questions have been organized so as to ask them to chief professionals, experts, researchers, project/program managers and defense planners from military, government and private sector who takes part in defense acquisitions.

Under the guidance of core answerers and documentary research made by author, 13 participants are defined as sample group for depth-interview.

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62 Susan M. Gates, *Shining a Spotlight on the Defence Acquisition Workforce-Again*, Santa Monica: RAND Corporation, 2009, p.5.
63 Murad Bayar, "Bir Konuk Bir Söyleşi-Program Yönetimi", *Savunma Sanayii Gündemi*, 17/4, (2011), p.10.
64 Gates, *Shining a Spotlight on the Defence Acquisition Workforce-Again*, p.15, 23.

Table 5. Information About Sample Participants

No	Organization	Experiences in defence projects	Edu. Level	Title
1	Military Unit	15+	Master	Manager/Engineer
2	Military Unit	15+	Master	Manager/Engineer
3	Military Unit	5-	Master	Manager/Engineer
4	Military Unit	5+	Master	Yönetici
5	Military Unit	10+	Master	Manager/Engineer
6	Defense Procurement Authority	10+	Master	Engineer
7	Defense Procurement Authority	15+	Bachelor	Engineer
8	Military Unit	20+	Bachelor	Expert
9	PrimeContractor	25+	Ph.D.	Manager/Engineer
10	Subcontractor	25+	Master	Manager/Engineer
11	Subcontractor	20+	Master	Manager/Engineer
12	Subcontractor	5-	Master	Expert
13	Subcontractor	5-	Master	Expert

Constraints

- Making use of only the open source on the research, due to the privacy of defense projects' documents,

- Not finding the opportunity to interview the people in the field not living in Turkey.

Data Analysis

Following the data analysis about the problem areas and maturing the thoughts and views, interviews have been analysed by "descriptive analysis method". Then solution proposals have been made by defining the common and diverse sides (thoughts) of different organizations in order to figure out the reforms needed to put the program management approach in Turkey into practice.

By attaching the views of participants, main themes have been diversified and simplified for the sake of clarity. Research themes can be seen in Table 6.

Table 6. Interview Themes on Program Management Approach

Organizational (Defense Industry)	Organizational (Public)	Inter-Organizational (Shareholders in Defense Planning and Acquisition Process)
Theoretical Knowledge and Awareness Level	Theoretical Knowledge and Awareness Level	Defining Needs
Experience in Practice	Experience in Practice	Capability Based Planning
Applied Methods	Applied Methods	Responsibilities in PPBS Process
Difficulties	Difficulties	Organization Structure
		Auditing Mechanisms

Findings Through Interview

It is understood through the interview with the defense industry professionals that program management standards based on PMI has newly come into prominence by a few of the organisations which need to manage a range of (mainly R&D) defense projects to attain their strategical goals. Those who have enough knowledge on project management procedures indicate an interest for building a new organizational scheme with the mentality of program management approach. However, the idea of designing and developing the systems which have certain level of commonalities together by seeking the possible strategical benefits has not been well-adapted by almost all of companies of interviewees. Participant-11 has commented on this by claiming that the program management approach seems to be more notional and theoretical comparing to project management process which has more measurable and applicable phases.

Main contractors on defense sector of Turkey seems well-aware of the concepts of project management, system engineering, system of systems and life-cycle management subjects together with the problem fields. Participants does not neglect the requirements of a sort of "governing body" which takes the responsibility of leading diverse projects and existing systems and correlating them with long-term strategies. Nevertheless, since any attempt to revise the business model based on program structure necessitates high-equipped and skilled personnel and organizational culture (which means a long period of time before adopted), they behave reluctantly towards such a fundamental amendment and continue to make use of project management tools though some of them have positions called development program directorate.

Participant 9. Initiatives for individual projects have started in 1989 and evolved to multi-projects structure through following years. PMBOK Rev4 procedures have been predicated from then on.

Participant 10. ... We compose risk management plan in accordance with project management guide. Tools such as *DOORS, JIRA, MS Project and SVN* are actively used to inspect the stage of projects' time, budget and quality standarts. Having said that, connection between project long-term outputs (both in positive and negative way) and organizational strategies needs to be established somehow for the ease of future strategical decisions, which is our weak side.

On the other hand, subcontractor-level companies have limited knowledge on project management methodologies in practical manner as **participant-13** states that they have no vision and near-future plans regarding project-program management.

Taking into account of program management standards, it might be deduced that software-intensive and R&D projects are more compatible for program scheme since the modules are developed simultaneously and easily integrated to other projects and/or other operational activities.

In general, interviews made in public organisations predominantly indicates the lack of information related to the program management procedures, the idea and potential benefits of program structures in terms of strategical defense planning process. Public officials and especially military personnel acknowledge the reality of the fact that numbers of large-scale projects get increased and cause a difficult environment for managers to lead the multi-disciplinary process. On the other hand, they do not easily adopt and embrace the program management approach as a roadmap so far as what the interviewees put forward during the research.

Moreover, a portion of the participants share the premise that program management is a method which may be facilitated only in the procurement organisations and it has nothing to do with the other stages of planning, programming and budgeting system.

Participant 3. Gaining benefits from the intersection of projects completely relates to the acquisition authorities. Operational needs and technical requirements are conveyed to the logistics/procurement division. System/personnel/budget usage from common pool need to be considered by procurement authorities then.

For the first time in Turkey, it has been possible to state this "program management concept" in public organisations of Turkey by Defense Industry Secretariate which had adopted the principle of "transition to Corporate Program Management" in their 2012-2016 Strategical Plan. However, it will make things easier in order to gain maximum benefit from this approach if and only if large-scale programs are considered mutually with the other shareholders.

Participant 7. The number of projects undertaken so far has reached a peak by 300, on the contrary, the average number of personnel in a project has decreased to level of 1,4. This circumstance make defining the priorities of projects, the content of strategical decisions and maintaining a healthy communication environment between the other stakeholders.

Participant 6. A working group consisting of 25 personnel has been given miscellenaous education regarding program management from *PRINCE2 and ESI International Institutes.*

Participant 5. We have not provided any kind of program management education in theory and practice. Our projects have been carried out by the personal efforts and experience of our staff. Earned experience has been conveyed from seniours to inexpert staff by master-apprentice relationship

According to the expressions stated by interviewees, transition for program management occurs slowly by covering only a limited number of organisations. The fundamental reason behind this fact is that decision makers find it easy to comprehend the product/output based approach compared to the program structure based on strategical benefit. It may be inferred that establishing such a comprehensive approach into organisation culture necessitates a great deal of time under these circumstances.

Participant 6. In order to succeed in such a comprehensive change in business strategy, not only it is required to obtain support from high level decision authority but also a cultural changeover in terms of our business mentality is to be achieved both in public and private defense sector.

Participant 6. In the lights of our strategical plan, we have established Program Management Information System which will enable us to make use of past and current project details easily. Nowadays, we have been striving for creating a pilot program structure, after that we will evaluate the idea of having a "program management office" and inter-organisational program concepts for the further steps.

Main contractors and project managers from public side have agreed on one thing that they could have realized some of their efforts for attaining a new specific technological capability which have already been developed by another projects inside or outside of the subject organisations. This indicate that we have to handle increasing number of projects by establishing a holistic view.

Inter-Organizational (Shareholders in Defense Planning and Acquisition Process)

Owing to the nature of defense projects which require the cutting-edge technology, a wide variety of prominent organisations need to contribute to the process from the beginning to the end. This undoubtedly increases the complexity of managerial process. Further, Turkey's planning, programming and budgeting process also necessitates at least three years to initiate any defense projects on the condition that relevant documents (National Security Policy Document, Strategical Plan, National Military Strategy and Operation Requirement Plans) have been completed in time. It indicates that duration for decision is more than required considering the fast changing technology constraint.

The fundamental reason behind this long time planning request seems according to interviewees that there has not been any single responsible authority to lead the whole process. Most of the organisations consider their own internal interests or responsibilities at first without sufficient communication efforts with their shareholders and in most cases, it turns into a contradictive approach resulting deviations to obtain the system or any other requirements at the field. However, as the program management standards confirm, a well-established program management consisting of large-scaled diverse projects may be achieved by the mutual efforts of all elements.

The inflexibility of planning process stands as a burden for defense projects specifically when it is required a revision of a number of projects which have already been proceeded to a certain level by procurer. Such a revision request needs to be handled in terms of budgeting, operational medium, present and future expectations on national strategies (which may affect the system requirements directly), and technological constraints of country's defense industry. Taking into account of reaction time of all shareholders from governmental perspective, almost all interviewees agree that this fact forms an obstacle to follow the timelines of any defense projects. Together with that, when a contradiction occurs between two or more agencies, no single

authority, which has a pure command over the process and related details is found available to come up with a decision.

Subject inflexibility also occurs due to the tight regulations of nations. For instance, since budgeting organs of government considers cost factors more important and neglects the operational priorities (disregarding the exceptions), and procurement officials carry the pressure of financial auditing procedures, authorities (except from the ones in operation field) behave in a reluctant and intolerant way to compulsory changes in projects. Furthermore, main and sub-contractors are tried to keep away from the planning and programming process with the intention of sustaining the competitiveness and fairness of governmental expenditures and security concerns. It has the possibility to cause deviations on the grounds that real capabilities of industry may not comply with the system requirements of projects. This case is seen in both projects and programs according to interviewees.

Following this further, though it is one of the main program management requirements, applicability of flexible and effective inter-organisational use of total human resources by program managers in government side seems nothing more than a dream for even the most developed countries. Those constitute the reason why program structures shall be an option for improving the defense procurement process.

Participant 2. Planning, programming and budgeting process is mainly focus on resource management, not categorizing the projects in terms of foreseen operational and strategic capabilities with an inter-organisational approach. Managing a number of projects are more than managing resources.

Participant 5. PPBS works as a concept for planning. However, without integrating the planning process with acquisition stage and operational feedbacks, this will stay as a "scapegoat" for any kind of deviations for defense organisations.

Participant 8. Main defense capability groups cannot be defined systematically within the direction of capability based planning. This impedes the prioritization of system/platform requirements. Country-wide defense capabilities need to be managed in a holistic approach.

Participant 4. Disconnection between procurement, financial, planning authorities affects the time frame and direct/indirect costs of projects. Duplications continue to occur in current and already-finished project efforts owing to the lack of communication… Integration meetings are held once or twice a year which lowers the effectiveness of programming process.

Participant 6. Same or similar requirements and R&D efforts are not being consolidated in most cases and tried to be procured/developed independently.

Participant 5. Every year, responsible organisation strives for completing its own area of responsibility. However, they are not able to see the complete picture.

Participant 3. Project and program planners are not allowed to communicate with

the procurement authorities or contractors under the restrictions of regulations.

Inferring from the discussions by the interviewees, including the acquisition organisations and potential contractors to the project process when needed by pre-informing them about the project requirements is considered as a positive contribution preventing from the time and budget deviations. By this way, more planned approach for improving countries' defense industry could be implemented by the defense actors.

Participant 6. Procurement authority is included to the project process later than it should be. This case does not let them make themselves ready for initiating and completing the projects since personel hiring and R&D efforts take substantial amount of time.

Program shareholder management necessitates the establishment of a program management office which will enable universities and research centers to take part in the process well in advance. However, regulations have still too much way to improve and contribute to the process.

Participant 8. Scientific analysis are not adequately done by the help of academic medium in order to combine strategic vision and end capabilities. Universities are in if and only if procurement authority call them to participate in the process.

Nonetheless, as creating such a comprehensive initiative and leading whole process requires, a program risk plan needs to consider all the inputs from external factors such as political upcomings.

Going through the organisation schemes within the aim of implementing program management seems to compose a common ground for almost all interviewees.

Participant 2. Peer positions in ministry of defense, joint staff, undersecretariate of defense industry and main contractors should be established under a superior board of program management. Consolidating individual project efforts of forces may facilitate the consistency of projects.

Participant 3. Understanding of Joint Portfolio Management needs to be established in organisations to be able to decide faster and focus on strategic benefits.

Participant 10. Program managers should be authorized to manage human resources and financial instruments between projects. This will enable projects to be prioritized accordingly to the conditions.

Model Proposal

In the lights of interviews and past project experiences, it can be understood that Planning, Programming and Budgeting System (PPBS) process being implemented by most of the NATO countries including Turkey does not stand out as a flexible system, it is too strict in every stages that any holistic approach does not seem possible to be applied. It is proposed that a unique "resource management structure" must be formed with the intent of overcoming unstable threats as soon as possible, managing

the change of system requirements in minor/major defense projects and enable the national strategies to be implemented.

In this research, by considering the issues of PPBS-user countries, an inter-organizational matrix model has been proposed, with the aim of arranging the relationships among project stakeholders. Details can be seen in *Appendix Figure-1.*   In this model, top level responsibility is given "Defense Resource Planning and Management Directorate" which may be formed under Department of Defense. That responsibility is thought to be discharged by a range of offices and boards. In this manner, an organizational scheme is considered to be able to relate cross-functionally with stakeholders instead of strict hierarchical relations. Besides, defense industry stakeholders are replaced into the process from the planning stage.

The model, in which several characteristics of traditional control-based approach and integrated program approach based on PMI's standarts could be seen, envisages that resource planning and management process are centrally-managed by top-level management which has been authorized with directing the process from defining the needs to the disposal stages.

The positions mentioned in the model are also proposed to be held inside the other stakeholders' organizational scheme as peers to a certain detail level needed. Breakdown of the responsibility through the defense acquisition process are deemed to be defined as indicated in the table below.

Table 7. Breakdown of the Responsibility of Authorities Indicated in the Model

Responsible Authority	Main Function
Defense Resource Planning and Management Directorate	• To undertake the responsibility of the whole defense acquisition process on behalf of government • To maintain and coordinate establishing projects and programs that deliver defense capabilities of country • To interact intensely with the relevant authorities in an effort to prepare the top-level documents leading to specify the operational requirements.
Capability Portfolio Management Office	• To move together with the working groups which verify the capability needs and performance expectations • To form the programs coming up with the right major breakdown of capability areas • To manage the relations and communications within the programs and with the exterior stakeholders • To advise program management office regarding the strategical upcomings • To audit programs in terms of change, life-cycle, contract, resource management aspects.
Joint Needs Specification Committee	• To verify the capability needs and performance expectations by making use of scientific methods • To be strategically in touch with universities, agents of industry, research organizations and armed forces • To contact directly and act with the intention of promoting benefits of defense industry.

System, Technology Development and Acquisition Planning Committee	• To develop the right technologies required by the end users of armed forces • To evaluate every requirement by the end user capabilities well in advance • To be strategically in touch with universities, agents of industry, research organizations and armed forces • To contact directly and act with the intention of promoting benefits of defense industry shareholders.
Program Management Office (including program managers)	• To be involved in the acquisition process from the beginning of "defining needs" phase • To support the efforts of program managers that seek an interface with systems in use and the ones being developed • To be responsible in prioritization of budget and allocating among projects of a program in a dynamic manner. • To hold the authority of assigning personnel from a project to another (when necessary), even if he works for different organization, by considering operational priorities • To inspect the projects and share the benefits/outcomes/earned lessons with related shareholders
Universities, Agents of Industry, Research Organizations and Armed Forces	• To be involved in the acquisition process from the beginning of "defining needs" phase • To hold their opportunity to contribute the end-product in an effective manner • To raise the intellectual knowledge of defense environment of subject country.

It is considered that this model based on the coordination of all components of defense acquisition process may be adapted and improved by countries, after evaluating the level of knowledge, technology and potential of industry, in addition to regulations of country.

Conclusion

Owing to the many-sided and unstable threat environment, together with the inclination towards decreasing spendings for highly-sophisticated defense systems, it comes out that the defense projects must be managed in a more professional way.

Despite a certain advances in managing complex, long-lasting projects one by one, examined studies point out that a reorganization of related shareholders needs to be put into practice, especially when considered the growing number and complexity of projects. Capability/scenario-based defense concept, which is adopted by many countries including Turkey, necessitates a "supra-projects management scheme" to be able to figure out to what extent projects' possible outcomes meet the capability gaps and thoroughly national defense strategies.

The success of defense projects depends on the macro-economic (instability of budget and cost inputs), politic (government program, conjuncture, bureaucratical impediments) and managerial (limitation of relations with contractors, other shareholders, instability of manpower, decision-making process) in addition to technical factors. This case supports the idea of establishing a supra-projects management scheme which will match the existing and planned Project portfolio with the strategic objectives of country. This framework will be responsible for the whole process, from the definition of concepts and programs to the disposal of systems.

Considering internationally-accepted program management standarts of PMI, a number of inferences may be made for defense organizations:

- Projects/alternative projects may be managed centrally to lead the organization to a common strategic goal set before.

- The usage of system/sub-system commonality may be raised through seeking for tactical/strategical relations between projects, leading to budget savings,

- An interface may be created between end-product and organization strategy through integrating program management office from the beginning of planning stage,

- Decision making process may be accelerated through giving enough authority to program managers and offices,

- Shareholders may be directed to collaboration to each other by making them adopt the program goals in order to maintain the common benefits,

- Comprehensive and inter-organizational risk management plans may be made and updated by deciding the priorities and importance of projects through the scientific analysis,

- Due to the longer life-cycle of programs, corporate and established framework may be formed to manage the continuous changes in a more effective way.

Whereas program management discipline, as examined in this research, has a theoretical infrastructure and international standarts, it necessitates not only organizational changes, but also the cultural reforms to be able to highly-adopted by the shareholders. It is apparent that moving the focus point from time, cost and quality expectations to risk, benefit and performance expectations is a painful and troublesome process. In this regard, the case of some program management offices which is established with the only purpose of a hierarchical stage over the project managers without considering inter-project relations and total benefits strengthens the previous inference.

In this concept, Defense Resource Planning and Management Model, proposed through examining the current position of defense programs, standarts and interviews made with the corporations in Turkey, puts forward an approach supporting the points below, in order to implement program management inter-organizationally in the defense planning process:

- Firstly, an environment of confidence must be established among the organizations in PPBS with the intent of making decisions together in every stages.

- In order to hold the responsibilites holistically in project process, organizing positions as peers to the related shareholders is fundamental.

- With the contribution of inputs provided by Joint Requirement Determining Board, an authority for managing the capability portfolio through their life-cycle

(mentioned as Defense Resource Planning and Management Model) and its subordinates (risk, change, life-cycle, contracting, resource planning and inspecting units) must be established by considering the country-specific conditions.

On the purpose of facilitating the use of program and portfolio management offices, another major step to be taken is related to reforms about legal procedures. High cost of projects makes personnel not take initiatives that may lower the speed and/or effectiveness of the projects, with the intention of guaranteeing himself under legal constraints. Providing that the changes on technical issues are discussed and decided by program offices (directly responsible for project success) instead of authorities from military/government/parliament, it might enhance the performance and success rate of projects. Another negative effect of strict regulations is to be impelled to conduct critical-requirement defining and technology developing activities only by means of military capacity because of "privacy" issues.

It makes the situation inextricable for defense industry agents to define long-term organizational strategy; in consequence of managing defense projects in a short-term, temporary and product-based fashion. Thus, including the industry earlier in the beginning of program life-cycle may affect the development of countries' defense industry.

Adjusting the auditing method of inspectors is another main factor that affects the practicality of program management approach. On the grounds of uncontrollable macro-extrinsic factors, inspectorates must adopt a responsive way of controlling the programs by focusing on attaining the defense capabilities as planned. This may encourage the project and program managers to apply to professional inspection authorities for checking the halting points in projects that they are responsible for. Thus, it leads managers to take measures much earlier and to respond possible deviating issues. Establishing an inspection mechanism that correlate the usage of resources and defense objectives by using some digitalized performance criteria seems another beneficial area to search.

Moreover, appointment policy of government organizations affects the the effectiveness of project personnel who take part in defense planning process. Creating a specific project pattern, which leads the ones working for government or private corporations to be assigned for simpler missions at first and gradually more complicated programs that need to be managed by strategical vision, may possibly have an influential step for the success of projects portfolio. For defense sector, the need for unique system/platform development through making use of domestic industry have an upward trend and this fact necessitates the continuity of well-trained program managers, especially working for government side. In this manner, program management has a critical importance for countries, in the meaning of top-level responsibilities and requirements for the capability of assessing the dynamics of defense industry and technological advances.

On the conclusion, it is deduced that a country-specific program management approach is possible to be developed and implemented by raising program managers

that can analyse and manage the risks, benefits and relations of projects responsively, throughout the entire planning, programming and budgeting process, with the contribution of academy and top-level policy makers.
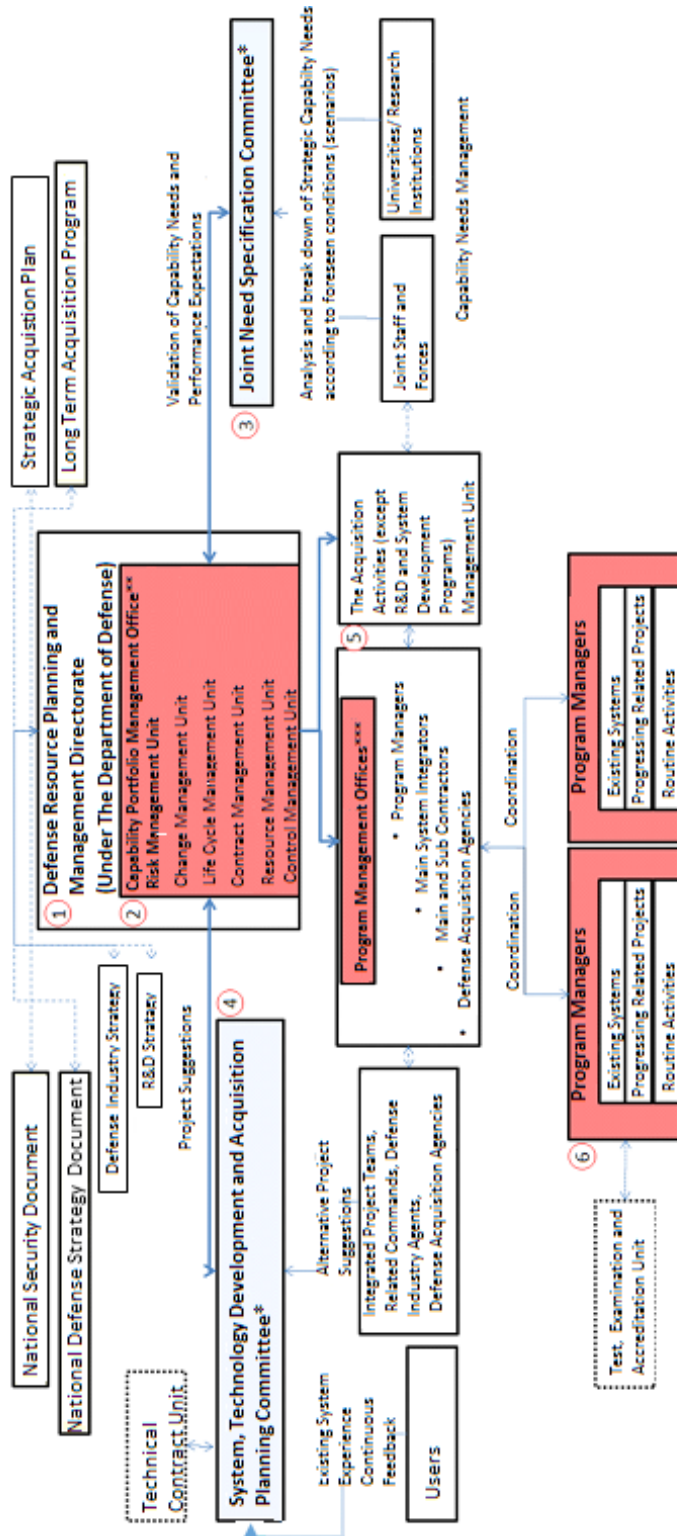
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Appendix Figure 1

PROGRAM-BASED DEFENSE RESOURCE PLANNING AND MANAGEMENT MODEL

Savunma Tedarik Projelerinde Sapmaların Önlenmesi Maksadıyla Program Yönetimi Yaklaşımının Uygulanabilirliği

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Öz: *Savunma tedarik süreci, stratejik seviyede birçok paydaşın rol aldığı, sahip olunan en yüksek teknolojinin kullanılarak, yasal ve mali kısıtlar altında arzu edilen savunma yeteneğini sağlamayı hedefleyen girişimleri barındırmaktadır. Söz konusu girişimlerin karmaşıklığının ve sayılarının artması ve birbirleriyle entegre geliştirilme zorunluluğu, savunma projelerinde sapmalara yol açmaktadır. Makalede, savunma planlama süreci özelinde savunma projelerinde görülen sapmalar kısaca tartışıldıktan sonra, birden fazla karmaşık projenin ortak fayda gözeterek yönetilmesi olarak özetlenebilecek Program Yönetimi yaklaşımı incelenmiştir. Program yönetimine ilişkin farkındalık seviyesinin değerlendirilmesi ve savunma program yönetimiyle ilgili çıkarımlarda bulunulması maksadıyla Türkiye'de proje yönetiminde görevli profesyonellerle "derinlemesine görüşme metodu" kullanılarak yüzyüze görüşmeler gerçekleştirilmiş ve savunma kaynaklarının daha organize bir biçimde yönetilmesi düşüncesinden hareketle program yönetimi konseptini esas alan bir "alternatif yönetim modeli" önerilmiştir. Sonuç bölümünde, yapılan araştırma ve görüşmeler ışığında önerilen modelin ve program yönetimi yaklaşımının uygulanabilmesine yönelik çıkarımlar yapılmıştır.*

Anahtar Kelimeler: *Savunma sanayii, Savunma tedariki, Planlama ve yönetim modeli, Proje yönetimi, Tedarik sapmaları, İnsan kaynakları.*