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PERFORMANCE BASED LOGISTICS (PBL): CONSIDERATIONS IN TURKISH DEFENCE SECTOR

PhD THESIS

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Department of Management

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Thesis Advisor: Prof. Dr. Dursun BİNGÖL

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TO THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION INSTITUTE OF SOCIAL SCIENCES (CLAIM FOR ORIGINALITY)

I hereby declare and affirm with my honor that this doctoral dissertation named "PERFORMANCE BASED LOGISTICS (PBL): CONSIDERATIONS IN TURKISH DEFENCE SECTOR" has been written by myself without taking any support that might be against to academic ethics and rules; it is the result of my scholar work; all quotations and paraphrases are cited and clearly exhibited on references whenever existing sources are used.

07 March 2018
Veli USGURLU

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07 March 2018 Veli USGURLU

To My Family

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ABBREVIATIONS AND ACRONYMS

A/C	**:**	Aircraft
A&D	**:**	Aerospace and Defense
ALC	**:**	Air Logistics Center
ASMC	**:**	Air Supply and Maintenance Center
CAQDAS	**:**	Computer Assisted Qualitative Data Analysis Software
CLS	**:**	Contractor Logistics Support
COTS	**:**	Commercial Off The Shelf
DLM	**:**	Depot Level Maintenance (and Repair)
GOCO	**:**	Government-Owned, Commercially-Operated
GOGO	**:**	Government-Owned and Government-Operated
GT	**:**	Grounded Theory
GTM	**:**	Grounded Theory Method(ology)
HR	**:**	Human resources
ILS	**:**	Integrated Logistics Support
IPPD	**:**	Integrated Product and Process Development
IPS	**:**	Integrated Product Support
IPT	**:**	Integrated Product/Process Team, or Integrated Project Team
IT	**:**	Information Technology
Iv	**:**	Interview
MCIP	**:**	Military-Civilian Industry Partnership
METU	**:**	Middle East Technical University
MoND	**:**	Ministry of National Defense, of The Republic of Turkey
MRO&U	**:**	Maintenance, Repair, Overhaul, and Upgrades
NATO	**:**	North Atlantic Treaty Organization
OEM	**:**	Original Equipment Manufacturer
O&M	**:**	Operations and Maintenance, (O&S: Operation and Support)
O&S	**:**	Operation and Support (O&M: Operations and Maintenance)
PB	**:**	Performance-based
PBA	**:**	Performance-based Acquisition/Agreement
PBC	**:**	Performance-based Contracting; used in UK as equivalent to PBL
PBL	**:**	Performance-based Logistics, or 'Performance-based Life cycle product support', (equivalent to PBC of UK)
PBSA	**:**	Performance-based Services Acquisition
PM	**:**	Program/Product Manager
PMSC	**:**	Private Military and Security Companies
PPP	**:**	Public-Private Partnership
PSI	**:**	Product Support Integrator
PSA	**:**	Product Support Arrangement
PSM	**:**	Product Support Manager
PSP	**:**	Product Support Provider

RQ	**:**	Research Question
SCM	**:**	Supply Chain Management
SME	**:**	Small and Medium-size Enterprise
SRM	**:**	Supplier Relationship Management
SSM	**:**	Undersecretariat for Defense Industries, of MoND
TAF	**:**	Turkish Armed Forces
TAFF	**:**	Turkish Armed Forces Support Foundation/Turkish Armed Forces Foundation
TBL	**:**	Transaction-Based Logistics
TF	**:**	Theoretical Framework
T&MC	**:**	Time and Materiel Contract
TR	**:**	Turkey/The Republic of Turkey
TURAF	**:**	Turkish Air Force
UDI	**:**	Undersecretariat for Defence Industries, of MoND; "SSM"
US/USA	**:**	United States/ United States of America
USC	**:**	United States Code
US DAU	**:**	Defense Acquisition University of US DoD, or 'US DoD DAU'
US DoD	**:**	Department of Defense of USA
US DoDD	**:**	Department of Defense Directive of USA
US DoDI	**:**	Department of Defense Instruction of USA
US OLRC	**:**	Office of the Law Revision Counsel (of the US House of Representatives)
WW	**:**	World War

ABSTRACT

PERFORMANCE BASED LOGISTICS (PBL): CONSIDERATIONS IN TURKISH DEFENCE SECTOR

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This study aims to explore the key points of adopting performance-based logistics (PBL) in those countries, where military logistics support is being provided by organic facilities, and a private manufacturing sector is in development stage. Within this context, the study utilizes Charmaz (2006)'s constructivist grounded theory approach on collection and analysis of the data, which is a combination of both the collected opinions of stakeholders about the PBL applications experienced in and abroad the country and the data obtained by review of relevant literature and documents; the resultant 'Grounded theory of adopting PBL strategy in other countries' is expected to fill an important gap felt both in literature and practices.

The results of the study show that, the PBL applications affect all the key stakeholders of the military logistics, which are; user (Armed Forces), the defence sector (both organic maintenance sector, and the private manufacturing sector), the institutions (universities/academia), and the administration (government).

The theoretical result obtained was: 'The PBL is unavoidable and could be hazardous if not applied in correct way; however, the PBL strategy can be used beneficially if the necessary measures are taken properly '. The key measures revealed within this context are collected under three categories; 1. To clarify the tenets of PBL and PBL applications (the statuses, missions, responsibilities, and inter-relations of stakeholders in military logistics), 2. To establish the infrastructure (support

organizations and legal regulations), 3. To create the directives and guidance documents for arrangement and management of each and every PBL contract. The resultant grounded theory implies the execution and continuous development of these measures by closely watching the PBL applications that inherently needs to be started from easy samples in order to adopt the PBL strategy in a beneficial and sustainable manner. In that context, the derived recommendations to all stakeholders are presented in the conclusion section.

Key words: performance-based logistics, grounded theory, military logistics, aerospace and defense, Turkey.

ÖZ

PERFORMANSA DAYALI LOJİSTİK (PDL): TÜRK SAVUNMA SEKTÖRÜNDEN MÜLAHAZALAR

USGURLU, Veli
Doktora, İşletme Bilim Dalı
Tez Danışmanı: Prof. Dr. Dursun BİNGÖL
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Bu çalışma askeri lojistik desteğin organik yapılarla sağlandığı ve savunma sektörü altyapısı henüz gelişmekte olan ülkelerde PDL stratejisinin benimsenmesine ilişkin anahtar hususların keşfedilmesini amaçlamaktadır. Bu bağlamda askeri lojistik paydaş temsilcilerinin yurt içinde ve dışında deneyimledikleri PDL uygulamaları hakkındaki görüşlerinin, ilgili alan yazını ve dokümanların incelenmesiyle elde edilen verilerle kıyaslanmasını da dikkate alarak, Charmaz'ın (2006) Yapılandırmacı Gömülü Kuram yaklaşımıyla elde edilen 'PDL stratejisinin diğer ülkelerde benimsenmesinin örtük kuramı', hem alan yazınında ve hem de pratikte hissedilen önemli bir boşluğu doldurmada katkı sağlayacağı değerlendirilmektedir.

Bu çalışmanın sonuçları göstermektedir ki, PDL uygulamaları askeri lojistiğin tüm kilit paydaşlarını; kullanıcı (TSK), savunma işkolu (organik bakım kesimi ve özel imalat sektörü), enstitüler (üniversiteler/akademik çevreler), ve yönetim (SSM) doğrudan veya dolaylı olarak etkilemektedir.

Analiz sonucunda, 'PDL kaçınılamaz bir stratejidir ve yanlış uygulanması halinde zararlı sonuçlar doğabilir; bununla birlikte PDL stratejisi, eğer gerekli önlemler doğru şekilde alınırsa yararlı olarak kullanılabilir' kuramsal sonuca ulaşılmıştır. Bu bağlamda, PDL stratejisinin benimsenmesinin anahtar hususları üç başlıkta toplanmıştır; 1. PDL tanımı ve uygulanması esaslarının (askeri lojistik paydaşlarının statüleri dahil görev ve sorumlulukları ile ilişkilerinin) netliğe

kavuşturulması, 2. Altyapı uyarlamalarının (destek kurumlarının ve yasal düzenlemelerin) yapılması, 3. PDL sözleşmelerinin hazırlanması ve uygulanmasına ilişkin yönetmelik ve rehberlerin hazırlanması. Ortaya çıkarılan bu gömülü kuram, PDL stratejisinin benimsenerek yararlı ve sürdürülebilir kullanımı için sözü edilen bu adaptasyonların yapılması ve basitten başlanacak uygulamalar çerçevesinde geliştirilmesi gerektiğini ima etmektedir. Bu bağlamda paydaşlara öneriler sonuç bölümünde belirtilmiştir.

Anahtar Kelimeler: performansa-dayalı lojistik, gömülü kuram, askeri lojistik, havacılık uzay ve savunma, Türkiye

INTRODUCTION

Background of the Study

Military logistics is as old as wars of caveman age (Keskin, 2011:143), then logistics can be accepted was born in armies to make the necessary support materiel ready when and where they are needed, and today it is used both inside and outside the armed forces; including civilian sectors, to support goods and services demanded for civilian and military purposes. However, even though the name remained the same, the definition of logistics changed a lot over time and continues to change (Keskin, 2011:111-194). The conflict about the definition of logistics for sure exist in literature and even in geographical locations, although the reasons might be discussed (Keskin, 2011:19-20). The use and scope of logistics especially shows quite a difference between military and civilian sectors, while it means supply, transportation, and storage in civilian version, in military the meaning is wider. In this regard, the North Atlantic Treaty Organization (NATO)'s definition of the logistics is;

> Logistics: The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:
> - design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposal of materiel;
> - transport of personnel;
> - acquisition or construction, maintenance, operation and disposition of facilities;
> - acquisition or furnishing of services; and
> - medical and health service support. (NATO, 2012:20)

is appropriate where maintenance of military equipment is seen as a core function and among many other requirements, especially ‘cooperation and coordination’ among the user and the provider are the key requirements for "All logistic support efforts, from both the military and civilian sector, should be focused to satisfy the operational requirements necessary to guarantee the success of the mission." (NATO, 2012:50).

Logistics is taken under three phases in the life cycle of an equipment in NATO Logistics Handbook. They are "Production/ Acquisition Logistics", "In-Service Logistics", and "Operational/ Consumer Logistics". The Production/ Acquisition Logistics is about industrial domain; covering mainly 'research, design, development, testing and manufacturing' phases, which are executed according to national requirements and the capability requirements of NATO through its special organizations in accordance with country's commitments. The operational/consumer logistics is about "providing direct logistic support to military forces" it is also known as "post-production phase", which focuses on the 'maintenance'. The "In-Service Logistics" on the other hand is most important for effective and efficient sustainment of existing systems and development of new systems ("Operational Capabilities") in accordance with the operational requirements of NATO. Operational capabilities include all the Operations and Maintenance (O&M) capabilities (2012:20-22). All these logistic activities are controlled and enhanced by specially formed departments (LC, IS, DI, etc..) for better performance, efficiency, effectiveness, and sustainability of the systems (NATO, 2012). All these issues are main works of aerospace and defense sector and the key point is; the maintenance and operation of the equipment are performed by "combatants" in NATO countries, and production is performed by "non-combatants" in conventional way. Lund (2016), reveals in his study that the skepticism is the reason for uncertainty in adoption of PBL in the military to include civil partners in the logistics chain, particularly in relation to military operations, the roles, responsibilities, and authority.

Maintenance of the military equipment is performed either by the user, flight line, military unit or by military factories; the first three are combatants and the last is combination of combatants and non-combatants but in military maintenance of the military equipment is performed either by the user, flight line, military unit or by military factories; the first three are combatants and the last is combination of combatants and non-combatants but in military facilities; where non-combatants are definitely different than contractor personnel, who works with special law in military facilities. The military factories represent the highest level of maintenance, highest level of the technical authority, and provides the highest level of maintenance services equivalent to the manufacturer, even better (in-depth) than the manufacturer because they are experts with years extensive experience.

Military factories are organic extensions of the governments and are not flexible enough to be adopted to civilian standards of business as private companies, although they achieve their missions. Complaints are about the length, cost and speed of the services compared to civilian companies, and inefficient use of the capabilities (assuming the usability by industry), and accumulation of excess parts and spares; materiel stocks. According to literature and interview data, reformist campaigns are going on for years in United States of America (USA) to make military factories better. The PBL is one of those, which is the adoption of the "power by hour" model that has been used for long time in especially commercial airliners maintenance. Conceptually it is completely controversy of the "time and materiel contract"; in the former the user/owner pays for the availability, on the later, payment is done for the repairs (workmanship plus the cost of the replaced materiel).

The conventional maintenance system is based on the replacement of the part/subsystem that is broken or malfunctioning and the repair or scrap and waste that material; i.e., "repair and replace" dominant. Randal et al. (2015:35) states that, "repair and replace" dominant logistics was leading the suppliers to make high revenues and profits while the user/owner of the system (i.e., government) was not able to bring technological or businesswise innovational solutions to maintain the defence equipment, hence leading to the increases in the parts stocks. At the result, the Operation and Maintenance or Operation and Support (O&M/O&S) budgets were increasing post-production costs; swiping the defence budgets, leaving lesser amounts to design and manufacturing of the new weapons/defence equipment that is demand of the operations (Gansler, 2000, June 27; Kobren, 2009:256).

Our equipment is aging. We cannot replace much of that equipment in the near future. Consequently, our Operations and Maintenance [O&M] costs will continue to escalate. This results in reduced readiness—yet at increasing costs. And, unless we reverse the trend quickly and deliberately, we face what I have described as a “death spiral”—a situation where reduced readiness requires us to keep removing more and more dollars from equipment modernization and putting it into daily O&M, thus further delaying modernization, causing the aging equipment to be over-used, further reducing readiness, and increasing O&M—a vicious circle. (Gansler, 2000, June 27:68).

When the background of United States (US/USA) defense logistics is investigated through the literature and governmental documents it is seen that, although the manufacturing sector is world class, there is still organic service providers, additionally their statuses are protected by the law (Cothran, 2007:6; Armed Forces, 1956). The main motive behind this is seen in Gansler's speech, and his policy on PBL that formed the directives (Gansler, 2000, June 27; US DoD, 2012:3; and US DoD, 2007b:5); where the main aim on keeping organics is to sustain the competition and co-operation between them in PBL strategy too.

The PBL is a proven strategy, attracted by other countries and sectors, however it is complex, and the adoption seems to be difficult. This study aims to brighten the adoption of PBL in other countries that have organic service providers and defence manufacturing industry. The outcomes of this study may contribute to the literature and to practices in adopting PBL.

This study is reported under four chapters as depicted in Figure 0.1 on next page; the Chapter 1 is Review of Literature, Chapter 2 is Methodology, Chapter 3 is Analysis and Results, and Chapter 4 is Conclusion and Implications. The literature review reported in Chapter 1 is later compared to Grounded Theory Method (GTM) application findings in Chapter 3.

Purpose of the study

This study describes a qualitative analysis of the responses of the military logistics stakeholders' representatives against PBL applications in and abroad. The prime aim of this study was to explore the critical key points on their opinions about their considerations on PBL and its implementation. The participants were purposefully selected authorities or highly skilled experts on PBL/logistics, with competent knowledge and experience.

Creswell (2009:12) describes a qualitative purpose of the study as containing information about the central phenomenon, the participants, and the site where research is done. The purpose of this study was to use grounded theory (GT) on the opinions of the decision makers/authorities who constitute the social system living in the military logistics system; with an aim to explore the grounded theoretical proposition of the PBL applications/implementations in aerospace and defence systems; consisting of key stakeholders in Turkey (TR); as government, user (force command), fundamental logistic service provider, private manufacturing industry.

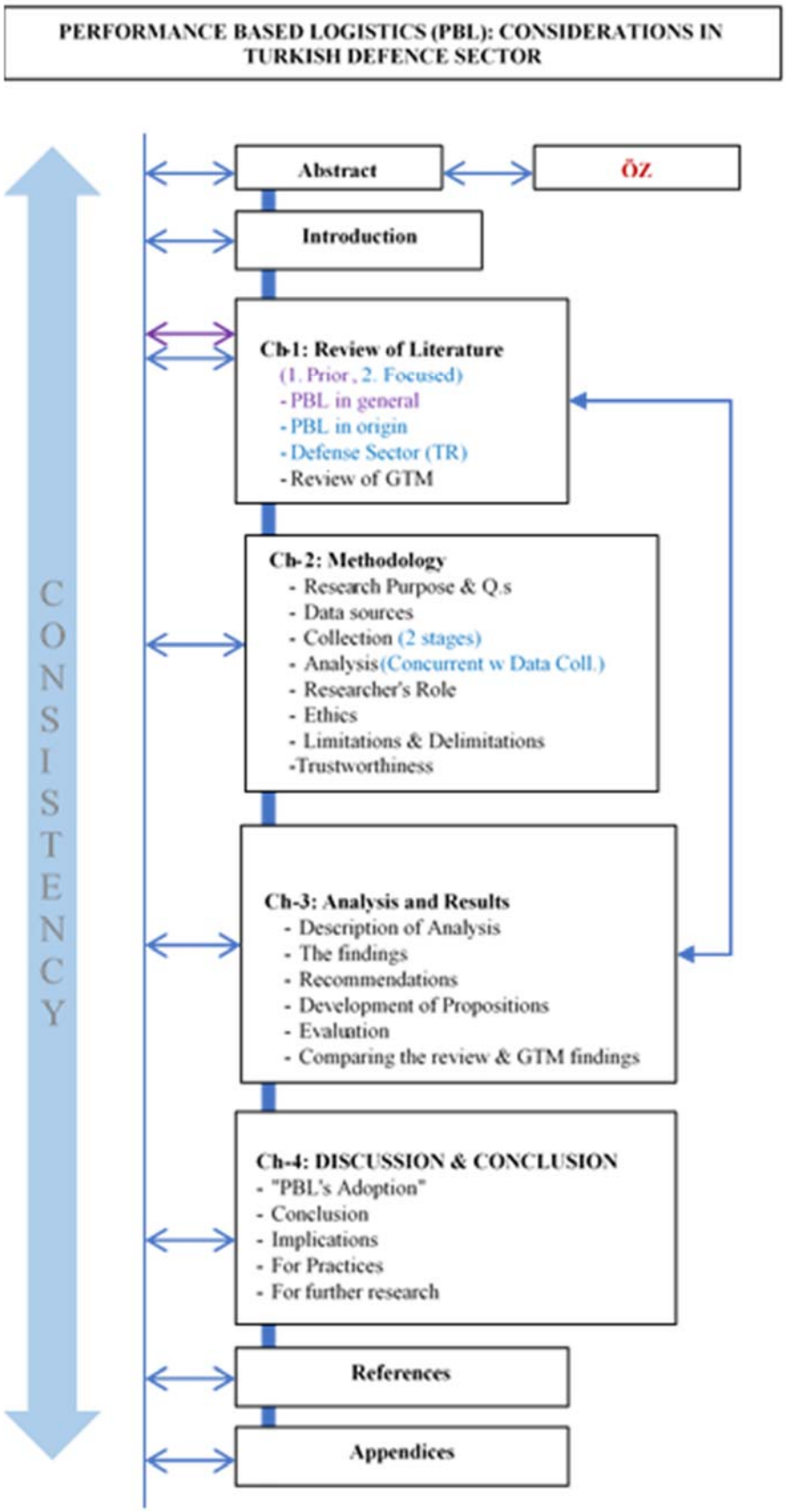

Figure 0.1: Structure of the thesis.

Significance of the study

The PBL is being used in emerged country for more than 20 years when considering the pilot studies, and it is still being developed. When looking from the adopting the PBL in other countries in maintenance of military systems of the armed forces, however, the literature in world is rare, only some master level studies came across. This study is one of the rare application of Grounded Theory Methodology in such a problem in military logistics; to reveal the critical (key) points in adoption of PBL through the opinions of aerospace defense logistics professionals and the related literature/documents. The results of this study directly or indirectly effect all the military logistics stakeholders. In that context, this study may be utilized for successful PBL adoption practices, as well as on application, implementation, adaptation practices of PBL strategy for the first time. The resultant theory can be tested in future, as an objective, universal, testable, falsifiable theory. In overall, this study contributes to a better understanding of the knowledge on military PBL strategy and its applicability issues, the results of this research may contribute to the literature for beneficial and sustainable adoption of PBL strategy.

Definition of Terms

The military logistics have numerous specific acronyms/ abbreviations/ terms. The abbreviations and acronyms used in this study is presented at the beginning of the report, and since the specific terms take up quite a big space, they are listed in APPENDIX A.

CHAPTER 1

REVIEW OF LITERATURE

The purpose of this literature review is to gain a deep understanding about PBL's definition, description, application tenets in the emerged country with a focus of adoption in other countries, then its comparison to conventional military logistics strategy, which is known as Transaction-Based Logistics (TBL), and comparison to the supply chain applications in civilian world, then its reflections first in other countries; and then in Turkey, and a GT review is added to check its properness in this study; as Charmaz (2006:167) describes a deep literature review in generating the grounded theory (of adopting PBL).

This literature review has been completed in two stages; first a prior review is carried out before the first stage of the interviews aiming not to cast a cloud over the GTM analysis, and then after completing the GTM analysis, the literature review is deepened to enlighten the analysis and findings by focusing on the revealed topics.

First, Postponing Literature Review, In a conventional way of quantitative research, first the literature review is done, the research question is decided and then the (primary) data gathering rules are defined and data gathering starts, and the format of report is: Table of Contents or Chapters Design in a traditional quantitative research is: 'Introduction', 'Literature Review– Theoretical/Conceptual Framework', 'Research Design- Methods and Data', ''Analysis', 'Conclusion'.

But, in a qualitative research, and especially with Grounded theory, the literature review is not required urgently for neither to find the gap nor to find a place to the research question. In fact, the primary data gathering, and analysis should start as soon as possible; Charmaz declares based on Holliday (2002) that; in opposition to the traditional research, the Literature Review-for-Theoretical Framework section is more important.

Second, The place of Literature review in GTM studies, Literature Review and Theoretical Framework (TF) will be related to grounded theory of the research, which will continue while drafting the literature review and theoretical framework (Charmaz, 2006:164-165; Creswell, 2009:26-27), and while writing the literature review and the TF before or after the chapter of method in dissertation report depends on the requirements of the situation (the requirements defined in the guideline, or Committee's requisition etc.), whereas the samples from both sides as doctoral dissertations are seen in the application (Quick, 2011; Katerinakis, 2014)[1].

Charmaz (2006:12; 2013: t. 08:32) says if for some reason, the researcher needs to prepare a literature review, it is O.K., but, it is needed to be repeated, and written after research findings are revealed. The Chapter 1 is used for reporting all the literature reviews in accordance with THK University's rules of writing the thesis, in other words, the literature review is carried away under two phases in accordance with the GTM requirement; initial before the GTM starts and a focused literature review to investigate the literature on the findings (results of GTM) to check the results of the GTM findings; but reported in one chapter, the reported shape reflects the last form.

From the researcher's viewpoint, the researcher is an experienced aerospace and defense logistician, and struggles to be a responsible researcher; therefore, the extended literature review was controlled till the findings of the research are revealed, and an initial literature review was carried out at the beginning; however reporting is held in two places according to the timing of need for literature review; if it occurred before the analysis, it is reported in the initial literature section (Chapter 1), and if an additional review is required after the analysis, the additional review also added to the original place (i.e., Ch 1),. This way, the complexity of the report is controlled, that otherwise some knowledge would be required to be repeated in both places.

Additionally, it needs to be noted that, PBL is a strategy of defense logistics which is tightly managed by the government, therefore, at most of the time finding

[1] Delaying the literature review until the end of the analysis in grounded theory methodology in accordance with the Glaser's dictum takes several attacks. Thornberg (2012) proposes using Informed GT Method approach, who adds (2012:243) "data sensitizing principles in using literature, which are: theoretical agnosticism, theoretical pluralism, theoretical sampling of literature, staying grounded, theoretical playfulness, memoing, extant knowledge associations, and constant reflexivity literature review strategies to the GT Method research approach.".
On the other hand, in data collection and analysis, the researcher is the main instrument of himself/herself says Thornberg (2012); since quantitative data is not used, and the data is collected by the researcher till s/he reaches the theory in her/his head, the researcher is the everything in the qualitative researches indeed.

plentiful amounts of literature were not possible; therefore, as suggested by Creswell (2009:181) some activity reports of the administration agencies were utilized inevitably as the source for the literature or as additionally during the mentioned comparison/checking purposes.

1.1 Focused Review of Performance-Based Logistics (PBL)

This section aims to gain a deep understanding about PBL's definition, description, application tenets in the emerged country.

To determine the source material as the relevant literature, structured approach in systematic search is used. Expecting the major contributions are likely to be in the platforms that the main idea was emerged, first government papers including government pamphlets to governmental journals, and conferences proceedings and scholarly articles together with books are looked for (Webster & Watson 2002:4-6). In order, this review to be systematic and complete, this research aimed to find all the available documents on 'performance-based logistics', 'performance-based contracting', 'military logistics', and 'Turkish Defense logistics' together with their close vicinity.

The research study was comprehensive to find any information, idea, data, and evidence that might be about the key sources, major issues and debates, political standpoints, origins and definition of, key theory, concept or ideas, structure and organization of the knowledge, main questions or problems still exist, epistemological and ontological grounds as described by Hart (1998:13-14) in defining "requirements of a good research".

As stated also lately by Webster & Watson (2002:6-8), the materials are reviewed in its most proper way for a thesis; concept-centric way and valued in an objective way.

1.1.1 PBL, General View

Emergence of PBL:

US Undersecretary of Defense, Dr. Gansler in his Memo (2000, April 5) for secretaries of the military departments directors, defense agencies director and defense

logistics agency, asks using Performance-Based Services Acquisition (PBSA). The target is 50% of all service acquisitions are to be performance based by the year 2005.

Cost wise look to PBL:

Kirk and DePalma (2005:3) states that PBL is in use since 1999 in US Navy, and PBL is basically not for to save money but specially to maintain or improve legacy (old) systems. Although a saving plus availability and reliability increases should be expected for new systems (like JSF for example) in long term (10 to 15 years) when a comparison is made with PBL and without PBL contracts. However, the PBL contracts are "still" not in that level and true outcomes of PBL contracts; the changes in the performance as well as the cost are still unknown and in risk.

Alper and Goodwyn (2011) six years later than Kirk and DePalma (2005:3), states that, PBL contracts on both component and system level are although increased, the savings are not prominently realized (12 % relative to traditional support, is just a statistical estimate; might not be so reliable!), and suggest competitive PBL (which can only be considered in USA, where the number of defence systems are large enough for giving away groups of them to different service providers to obtain competition).

Bakar et al., (2012:33), five years later Spicer et al. (2007:9, 20) highlights the PBL as the challenges for all (of the stakeholders) and especially for the government.

Definition of PBL in general look:

Berkowitz et al., (2005:259) named the PBL contracts as Public-Private Partnership PBL and classified by the providers identity: public (military factories), private companies, and military factory and commercial company partnerships.

Jones, (2006:24-3) defines PBL under Contractor Logistics Support (CLS) on his Integrated Logistics Support (ILS) Handbook. The CLS is the main category covering all the contractor business during the operation phase of a system; it could be either in "product" or "service" type. In product type of CLS, the contractor is responsible from supplying parts; it could be additional or replacement spares, repair parts, or revised training course material, or maintenance technical manuals, or modifications to test or other support equipment.

On the other hand, services provided by contractor may include anything from repairs of LRUs (line-replaceable units) to total Maintenance, Repair, Overhaul, and Upgrade (MRO&U) services of commands. The reason of transferring this support from (organic/military) organizations to a (private) contractor is to reduce the cost of

having and using (ownership of) those systems or focusing on the gaining technical/management advantages.

Although many governments today utilize CLS in supporting their military systems, Jones (2006:24-3) claims that, (almost) none of them has a consistent policy on what it is or how it is to be used. Indeed, CLS needs to be planned at very early stage of an acquisition program to assure its success.

A government either will manage all the details of contractor's activities to pay accordingly or will let the contractor to manage all the required activities but achieve the result and pay accordingly. The first approach is becoming history, now many governments are choosing the second way for a service contracting. The only provision is to determine a measure of contractor's performance on the support service provided; which gives the name of this approach: performance-based logistics (PBL). At most common applications, the measures are either availability of spare(s) or availability of being operational.

Since the control of a part's availability is much more straightforward (than control of a service's availability), so does the implementation of performance-based contracting (PBC) (or say PBL) on availability of parts are much easier, hence they were more common at the beginning. It was beneficial for both sides also; contractor streamlines the repair for maximizing the profit, government do not need to control the contractor, therefore economize.

On the other hand, the control of availability of status of operational is very difficult unless the government gives up to control of the activities of a contractor. Jones concludes with pointing out the importance of the preparatory activities during the acquisition phase of the system; the success of CLS so does the PBL (here) depends on these efforts, which are indeed dependent on the features that is gained through the design for supportability of the system (Jones, 2006:24.2–24.3). This is the reason where the manufacturer is advantageous on PBL.

Guajardo et al. (2011) note that Airlines are outsourcing MRO&U services in many kinds of subsystems of aircraft (A/C) such as hydraulic, avionics systems, engines etc. (which are technology-based services), in order to condense to their core functions besides reducing cost. On the other hand, "it is quite common for the Original Equipment Manufacturer (OEM)s that manufacture the systems and subsystems to offer support services for their own products" (Guajardo et al., 2011:964).

Who can do PBL?

Aircraft industry analysis made in USA in 2007 shows that PBL is especially appropriate for OEMs as "lucrative aftermarket services" (Spicer et al., 2007:9, 20). Among the pioneers of service providers by the OEM are giants of aerospace industries such as Boeing, Lockheed Martin, General Electric, Rolls Royce, and Pratt & Whitney (Guajardo et al. 2011:964).

Although PBL is more appropriate for OEMs as Spicer et al. (2007:9, 20) point out, there are examples of non-Original Equipment Manufacturers capable of providing PBL; Korean Aerospace Industries (KAI) with 4.9 billion USD production value, has Depot Level Maintenance (DLM) capabilities of US made F-15, F-4, P-3C, C-130, ALT-III, CH-53, UH-60 and modification/service life extension program capabilities of F-15, F-16, A-10, Lynx, which are all military aircraft either fixed wing or rotary wing. KAI, mainly a passenger aircraft manufacturing company, which is experienced in MRO&U capabilities for Passenger aircraft in (South) Korea, and now has PBL Pilot Program, and PBL Business Expansion programs on those military MRO&U capabilities (Korea Aerospace Industries Association, 2015:20, 33, and Korea Aerospace Industries Association. 2017:24-25).

Jones (2006)'s look is from 'CLS' point of view, Gaujardo et al. (2011)'s look is from 'outsourcing' stand point, and there are literatures in this context, and it is seen that both OMEs and non-OEMs can do PBL; all these are good explanations and insights for general civilian and military logistics or maintenance issues in PBL, but they still lack of the sensitive issues of PBL from adopting it beneficially and sustainable manner into military logistics.

For instance, Selviaridis & Wynstra (2015), in their literature review of 241 article, highlight the importance of performance description and measurement, the importance of the incentives in performance-based contracts, and finally the importance of risk management issues in PBCs, and concludes with the need of future research especially on better understanding of performance based contracting design and management (Selviaridis & Wynstra, 2015 3521).

1.1.2 Definition of PBL From Military Standpoint

Frost & Sullivan, (2009:11) recommends for Governments and MoDs to accept a framework including Public-Private Partnership (PPP); "PPP across the entire supply

chain", in order to ensure that government is providing incentives to not only domestic industry but also to the all private sector to develop better products and services. As incentives are drivers for quality and innovation for profit seeker private sector, the penalties are the tools of sharing the risk of failure with the private sector (Frost & Sullivan, 2009:12). For a private company as Product Support Integrator, management of all the suppliers and parts, and integration to the Information Technology (IT), beside the logistic process is necessary. A private company and PBL concept is better to be understood if accepted as 'Performance Based Lifecycle Product Support' (Frost & Sullivan, 2009:13).

Department of Defense of USA (US DoD) Under Secretary of Defense for Acquisition, Technology, and Logistics defines it as (US DoD Defence Acquisition University, 2016:107):

> PBL is an outcome based support strategy that delivers an integrated, affordable product support solution that satisfies Warfighter requirements while reducing Operating and Support (O&S) costs. When dealing with industry, product support outcomes are acquired through performance based arrangements that deliver Warfighter requirements and incentivize product support providers to reduce costs through innovation.

As an acquisition methodology mandated by US DoD, the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics is the main authority and gateway that provides all the directives, new developments, and links about PBL and its application into military logistics in USA.

All these definitions like many others are generally away from giving both explaining the position of the military factories in PBL and the strategic hints of PBL that recalls Gansler (2000, June 27:68-69)'s statement about the 'Logistics Transformation' before Congress, touching the core codes of 'death spiral' (2000, June 27:68); (="we cannot produce new systems"), 'aging legacy equipment' (2000, June 27:68); (="We need to produce new systems"), 'competitively sourced support'.(2000, June 27:69); ("Public-Private Competition"), "expand the use of competitively sourced support for both new and legacy systems; expand our partnering arrangements" (2000, June 27:69); ("Keep the Public depots, connect with industry under PBL formula for old and new military systems, for competitive products/services besides improved and

developed depots/industry”), "It’s our responsibility both to the warfighter and to the taxpayer" (2000, June 27:69); (“To supply better weapons to Armed Forces, and better jobs to citizens”).

PBL, first is emerged in military, therefore apart from the literature, there are considered number of governmental documents about the PBL; among which a directive; Department of Defense Directive of USA (US DoDD); US DoDD 5000.01: The Defense Acquisition System (US DoD, 2003), and a Guidebook are worth to mention (US DoD Defence Acquisition University, 2016). The literature on the other hand about reviewing the PBL applications in USA (e.g., Cothran, 2007).

When the Directive 5000.01 is reviewed, it is assessed in US DoDD 5000.01, E1.1.17 as (US DoDD, 2003:7) that, the PBL is made the formal method (preferred product support method for US DoD) of sustaining the military systems in military inventories since May 12, 2003.

It is noted that the public and private sector capabilities are highlighted by italic letters in the definition statement. It is also understood that, this subject is iterated in PBL Guidebook (US DoD Defence Acquisition University, 2016) and US DoD’s PBL Directive 5000.01 (US DoD, 2003), but their reviews are postponed to Chapter 4 (Literature review after GTM analysis of the collected opinions).

The PBL in that context would easily be seen as the found way by Gansler in his speech to American Congress (2000, June 27) as a shared purpose and mutual confidence among Congress, US DoD, and Industry, for doing business in favor of "a renewed quest for excellence" (Packard, 1986:xii).

1.1.3 Application of PBL

PBL guidebook (US DoD Defence Acquisition University, 2016) provides all the details of the PBL applications; how PBL works and, phases of applications are depicted, and although only some are required as is or with modification specific to the requirements, a 12-Steps are explained for a successful PBL implementation for components, subsystems, or systems.

The 12-step product support strategy model is very detailed guide designed as the iterative process for successful arrangement of PBL contracts; where the model is reconfigured at each specific program. The order, or the places of the steps may be

changed, they may be repeated or deleted according to the specific needs; with other words according to the life cycle support requirements of the subject program.

The US DoD's 12 Step product support strategy approach to PBL is shown in Figure 1.1 below.

Figure 1.1: The US DoD's 12 Step product support strategy approach to PBL (US DoD Defence Acquisition University, 2016:27).

In overall that can be interpreted as the PBL is not easy as let a contractor do the business, but need to be carefully adjusted, planned, and managed.

In management of PBL contracts, consistent reporting, regular communication with key stakeholders and assessment of the performance of the arrangement at routine, and at designated times are highlighted as crucial activities of management of the PBL contracts (US DoD Defence Acquisition University, 2016:103).

After the arrangement, the management of PBL contracts are visually depicted in Figure 1.2, below.

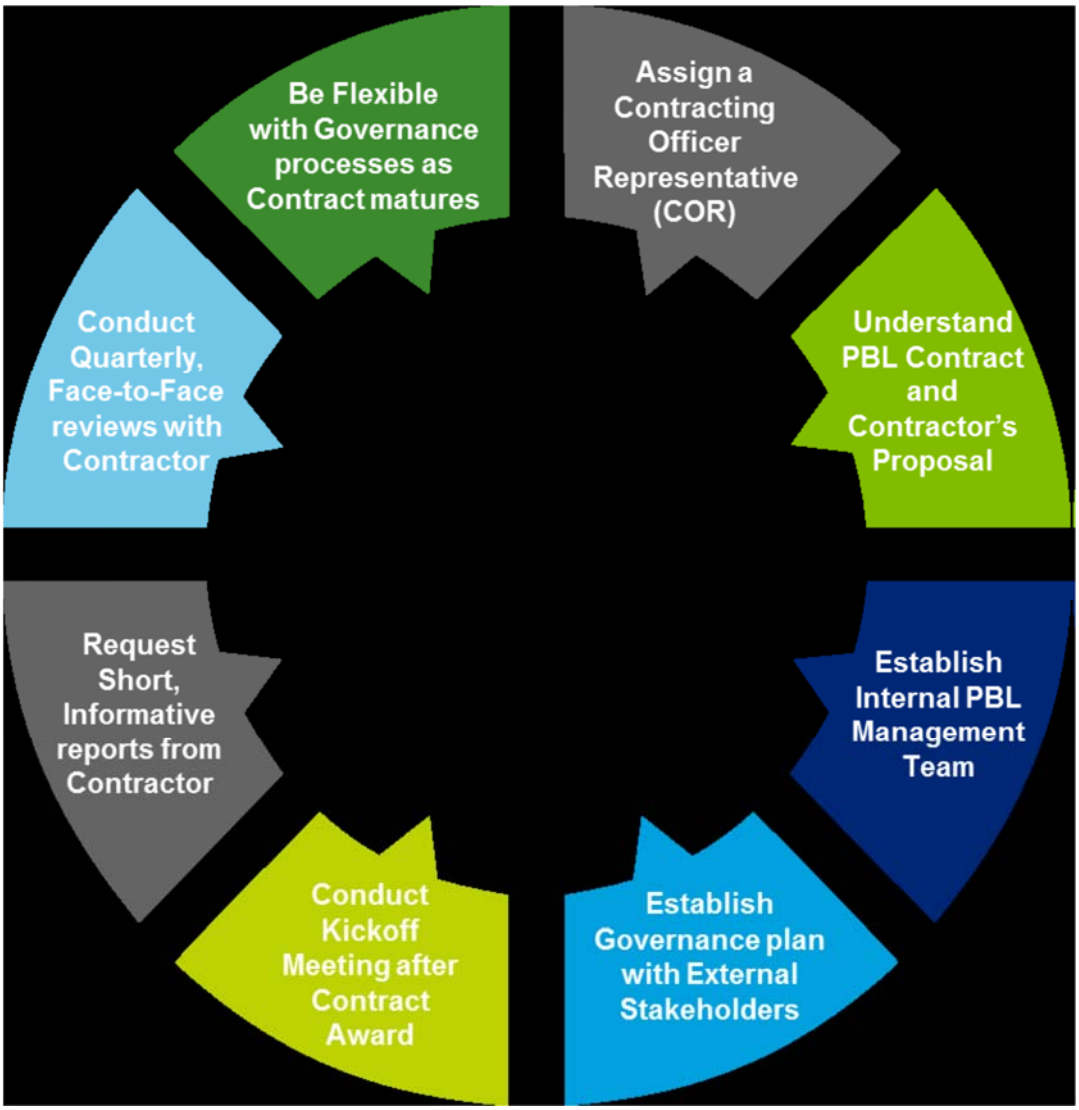

Figure 1.2: Best Practices for managing PBL contracts post-award (US DoD Defence Acquisition University, 2016:103).

With so detailed contract arrangement, PBL may give a perception to giving the logistics jobs to private sector, after a quick review it is seen that it is not wrong, at the same time the private sector is not the only choice; it is noted as "PBL's are structured as 'government only', 'government-industry partnerships' and 'industry only' arrangements." (US DoD Defence Acquisition University, 2016:121). Interestingly, the incentivization for the organics is done by improving its capability and capacity and ensuring/increasing workload (2016:111). Another interesting point is the statement "Bottom line: PBLs may involve outsourcing. However, it most often does

not, and the government has complete control over how PBLs are structured – not industry." (2016:121).

According to Assistant Secretary of Defense (Logistics and Materiel Readiness) study in 2010 about the effectiveness of PBL analysis; a properly structured and executed PBL contract may reduce the service costs by 5-20% per year, while improving the readiness, if PBL tenets are respected (US DoD Defence Acquisition University, 2016:12). Those tenets are shown in Table 1.1 below.

Table 1.1: Tenets of PBL (US DoD Defence Acquisition University, 2016:103).

Tenets of PBL	Description
Tenets Tied to Arrangements	1. Acquire clearly defined Warfighter relevant outcomes - not just sustainment services or replacement equipment 2. Use measurable and manageable metrics that accurately assess the product support provider's performance against delivery of targeted Warfighter outcomes 3. Provide significant incentives to the support provider that are tied to the achievement of outcomes (for aspects of performance that are within their control) 4. FFP contracts are generally the preferred contract type (FPIF and CPIF may be effective) 5. Provide sufficient contract length for the product support provider to recoup investments on improved product (e.g., MTBF) and sustainment processes (e.g. manufacturing capabilities)
Tenets Tied to Organization	6. PBL knowledge and resources are maintained for Government team and product support providers 7. Leadership champions the effort throughout their organization(s) 8. Everyone with a vested interest in the outcome is involved 9. Supply chain activities are aligned to the desired PBL outcome, vice disparate internal goals 10. Risk management is shared between the Government customer and support provider

The tenets of PBL is shown in the Table 1.1 above, as it is seen from the table, tenets are categorized under two main headlines; five tenets that should be in followed in the arrangement of the PBL contracts, and other five tenets that denoting the features of the organizations, with other words by the role player stakeholders as Government teams and contractors (which is described above as government only, government-industry partnerships and industry only).

In another study (Vitasek & Geary, 2008), 20 tenets of a successful PBL are described under four success categories;

"Success Factor #1: Committed Relationship

1) Champions for the PBL Business Model
2) PBL Knowledge Base
3) Stakeholder Analysis
4) PBL Center of Competency

Success Factor #2: Alignment

1) Organizational Alignment
2) Develop a Win-Win
3) Business Model
4) Supply Chain Integration
5) Asset Management
6) Workload Allocation: Best Value
7) Appropriate Risk Pricing, Management and Allocation

Success Factor #3: Contract Structure

1) Pricing Model
2) Incentives
3) Contract Length
4) Off-Ramps
5) Workscope Flexibility
6) Funding

Success Factor #4: Performance Management

1) Establishing Top Level Desired Outcomes
2) Performance Reporting
3) Continuous Improvement
4) Metrics Aligned to Suppliers"

In both evaluations, the significance given to the expert knowledge and educated, trained, and authorized personal competency of the human resources are noticeable in both of categories; when arranging a new PBL contract, and when managing a PBL contract. Additionally, the emphasis on the "PBL knowledge and resources are maintained for Government team and product support providers." (US DoD Defence

Acquisition University, 2016:12) is noticed that denoting especially the competency of Government authorities in the PBL contracts[2].

1.1.4 Defence Industry; Public and Private Sectors as The Role Players

US PBL Guidebook (US DoD Defence Acquisition University, 2016:11) describes the history of PBL strategies starting in commercial aviation sector referring by "power by hour"; that the payment is based on the availability and sees the PBL as the adopting this proven strategy to military logistics with best practices of both Government and industry (2016:10); pointing out the organics and private sectors.

PBL is “Performance-Based Life cycle product support”; is an arrangement of product support activities (such as supply, maintenance, engineering etc.) consisted of both Government’s and industry’s best practices with metrics and incentives. The guidebook explains the relationship between the government and the contractor; where each need the other, in a cooperative and at the same time adversarial way; government need the weapons; therefore, the industry, the industry needs the government as the buyer. Government needs to buy quality products and services “at a fair and reasonable price” while industry wants to maximize the profit. If structured and executed properly, Performance based support arrangements between them, may provide increased or equal availability at lower cost for each unit of performance (cost per operating hour for example). At following contract renewals, the government may further reduce the cost to benefit from the improvements done in the PBL application by the contractor. Here, it should be noticed that, the contractor; actually the 'Product Support Provider' (PSP) in a 'Product Support Arrangement' (PSA) could be any one; The original system manufacturer, a part supplier, a subcontractor, a support contractor, commercial MRO company, or even ‘logistics Command’, or one of the depots (‘organic military factories’), or a combination of both Public and Private entities through a ‘partnership agreement’ (US DoD Defence Acquisition University, 2016:4-86).

It is important to note that, if manufacturer is engaged in PBL, alone or in partnership with a depot; then the product knowledge and experience will provide new improvements in repairs or maintenance, furthermore, the obtained improvements can

[2] This information coincides the codes and findings in the GTM; the outcome of the empirical research was also noting the 'PBL and its applications need to be redefined', 'the PBL is not easy', and. 'the competency of the government's-engineers' were also expressed in the interviews (These notes are written after GTM analysis, during focused review of the literature).

even be integrated to new/concurrent products (US DoD Defence Acquisition University, 2016:84). As Cothran (2007:6) notes, in USA the most of the PBL arrangements are mixed type because of the Title 10 US Code's sections 2464 and 2466 (core capabilities and 50/50 issues), pushes to combining the knowledge of the product, and experience of the repair and maintenance that increases the potential of obtaining an improvement in repair or maintenance and an effect back to the design of the production and therefore an improvement in the next party of the products becomes obtainable[3].

Lockheed Martin Corp's (2014) briefing to Logistics Officer Association Symposium – 2014, coincides with these findings, since it is from a private company, it is important to see the evidences of these regulations mentioned. Some of the findings are; any supplier, public or private, that provides products or services in the sustainment of a US DoD system can be a Product Support Provider (2014:84), workload allocations are depending on the statutory requirements while taking into consideration of best combination of public and private capabilities, and maximizing use of performance based strategies in comparison to Transaction Based Support (2014:94), considering PPP in PBL implementation strategies, while maximizing the utilization of the government's facilities, equipment, and personnel (2014:95), the necessity of maintaining core logistic capabilities in Government-owned and Government-operated (GOGO) facilities to ensure effective and timely response to a mobilization, national defense contingency situations, and other emergency requirement (2014:97), 50% rule of performing all works in military factories (2014:98), and forming the Product Support Manager (PSM) IPTs (2014:110).

1.1.4.1 Public/private sectors (Who is increasing the prices?)

In mid-1980s, US President Reagan appoints a commission chaired by D. Packard (later the commission is named as Packard's Commission), about Defense Management (specifically to investigate the reasons of heavy expenditures in defense, such as USD 435 for a hammer). One of the main results of this commission was to establish 'Under Secretary of Defense for Acquisition' (now Defense, Technology and Logistics), and Joint Requirements of Management Board(s) chaired jointly by the

[3] This information coincides the codes and findings in the GTM.

military and the acquisition (Packard, 1986). The equivalent of this institution in Turkey is 'Undersecretariat for Defence Industries (UDI) of Ministry of National Defence (MoND)' (Savunma Sanayii Müsteşarlığı-SSM), which was emerged in 1985 by Law 3238 (MoND UDI., 2017c).

Although public side is considered generally whenever effectiveness and efficiency are considered between public and private organizations, there is little real study about the efficiency matters of organic facilities in general; especially in military logistics. Gruber, (1999) tries to explain how a negativity becomes an issue by false perceptions about the organic sustainment while denoting some real disturbances they are causing, he makes several recommendations such as giving well-defined contracts to them and measure their responses, and combining the personnel of organic and private sides in both organic and private sector facilities; letting them know each other at work places. He concludes by highlighting the need for their existence and be a competitor to the private sector.

Younossi, et al. (2007) conclude after their research on the attitude of Military Systems' Cost Growth; despite the many acquisition reforms and management initiatives done by the US DoD since 1970s, the development cost growth has not been reduced and it is much higher than other public works. Younossi et al. (2007) add that the systems developed by US DoD to control the cost are more complex than the previous ones. Younossi et al. (2007) agree that the increase on the growth of cost of weapons is not the indictment of either public or private sectors people.

Younossi et al. (2007) agree on the reasons of growth in the cost of the military systems as; adaptation of high levels of technology and schedule uncertainties, together with software density, system integration complexity, and the like. Some of the other reasons they mention are estimating errors, unrecognized technical issues, over optimism, lack of incentives to control cost, changes on the requirements (requirements creep), which form a very large spectrum. Therefore, Younossi et al. (2007) suggest the involvement of the stakeholders in US DoD, which means wide competition.

1.1.4.2 Small businesses

Small Business Participation; "facilitate small business participation throughout a program's life cycle through direct participation or, where such participation is not

available, through fostering teaming with small business concerns." is incentivized in US DoD Directive (US DoD, 2003:8-9). There are 300,000 small and medium size enterprise (SME)s in USA exporting to foreign markets, that are accepted as "the backbone of the U.S. economy, creating two-thirds of all new jobs in recent decades". SMEs are described as realizing 98 % of all exporters and are fast-growing new-job creators (direct and indirect four million jobs) with higher wages. (The Office of the United States Trade Representative (USTR, 2017).

Small private sector goes to invest in the openings, opportunity areas that they can contribute in the existing competition conditions of their expert fields, and naturally and inherently to civilian area. They, especially the small businesses do not look into the governmental fields, there may be several reasons they do not want to deal with government. Therefore, to attract them into the collaboration the government needs to make the necessary initiations, better in a programmed way. In that sense, the US Governments efforts can be seen in a wide manner, the website resources for small business is reachable to all from Acquisition Community Connection page of US military university; 'US Defense Acquisition University' (US DAU)'s website[4]. A big and systematic effort is easily seen to reach especially to the small and new (not-collaborated-yet) companies[5].

1.1.5 PBL Using Strategies (Levels/Types of Arrangements)

PBL is an option available to use, when it is decided to be used and the conditions are arranged by government; however, it does not turn off necessarily the other existing contract options for DLM (Depot Level Maintenance includes Repair). Therefore,

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[4] https://acc.dau.mil/CommunityBrowser.aspx?id=738444&lang=en-US, is just an example, some other is; 'The Office of the United States Trade Representative' (USTR, 2017), 'Small Business'; retrieved June 6, 2017 from https://ustr.gov/issue-areas/small-business#, or from http://www.airforcesmallbiz.org/. The total number of official US websites is 92 that especially useful for small business to make market search, outreach, or search for policies.

[5] That kind of collaboration facilitations consist of universities, institutions, government organizations, which can be counted as another obstacle of PPP and a barrier of PBL that need to be overcame. Those websites are to enhance the interest of private companies to Public interests. Whereas, apart from those official support providers, there are also some commercial equivalents of these support providers; as an example "AcqNotes"; provides 983 topics to interested companies, their catch-phrase is: "Defense Acquisitions Made Easy" and their purpose is declared as to provide "... the Aerospace community with an easy source of Department of Defense (DoD) acquisition related information, guides, templates, instructions, news, resources and community interaction" for inviting and incentivizing the small businesses into public contracts (http://acqnotes.com/). That list of the said service, may as well be used as initial seek of the aerospace industrial legislation.

using PBL choice in DLM contract awards as an option should require its own considerations; those are reviewed in this section.

PBL as a business model in DLM contracts should be decided very carefully on determining the level of application. It can be applied at component, subsystem, system, platform levels as it is seen on Figure 1.3 below.

It is advisable to start with giving out contract awards at low levels at first applications (at the beginning period of using PBL). The levels of PBL application strategies are seen in Figure 1.3.

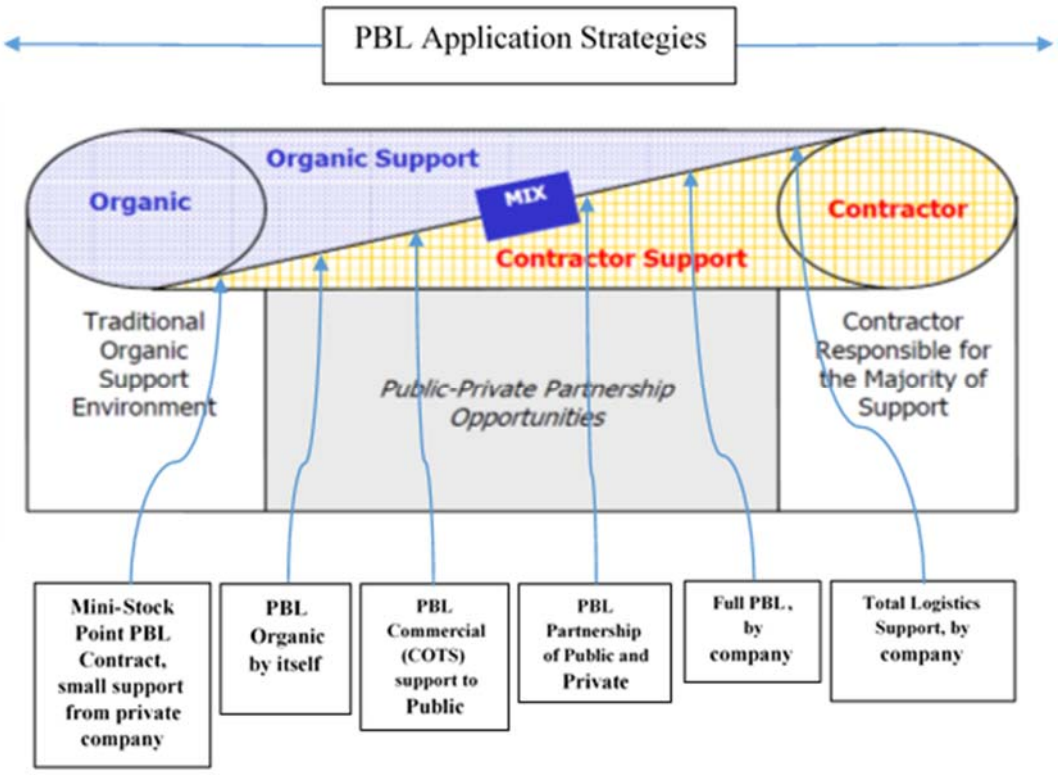

Figure 1.3: Spectrum of PBL application strategies in military logistics (Modified, from US DAU 2005, in (Gansler & Lucyshyn, 2014:12) and Doerr et al. (2004:11).

The strategies are chosen by government among these choices according to;

1) "Age of system (phase in life cycle)
2) Existing support infrastructure
3) Organic and commercial capabilities
4) Legislative and regulatory constraints" (US DoD Defence Acquisition University, 2018).

As the PBL being only one of the product support strategies, it is advised that the support strategy for a defence system has to be chosen among the all possible choices. The spectrum of the strategies for a defence system's support is shown in Figure 1.4 below.

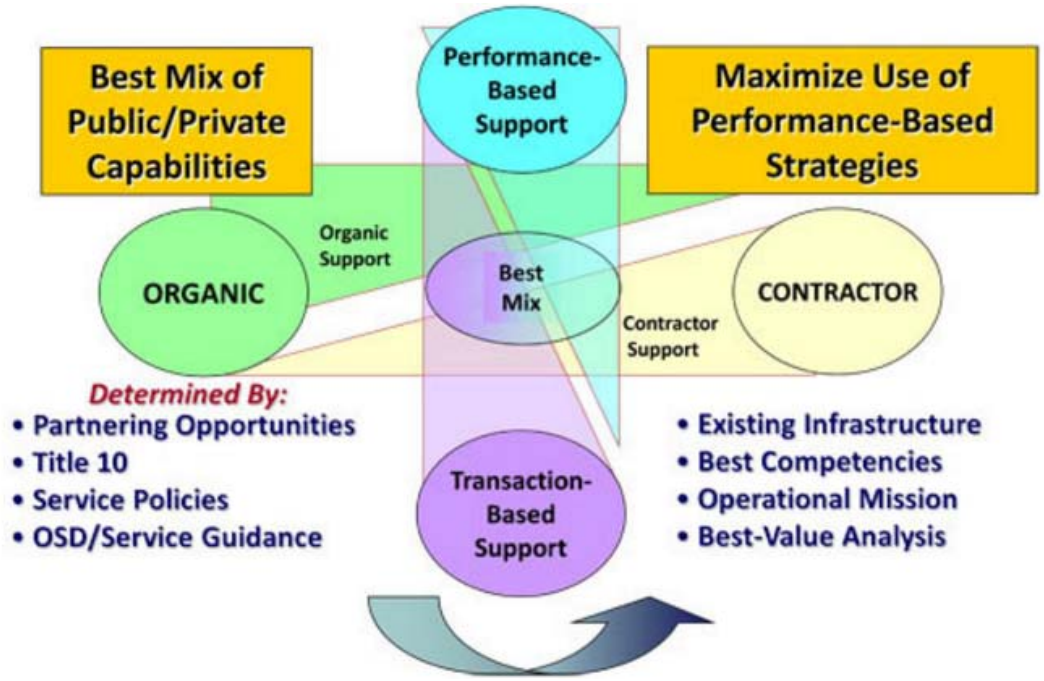

Figure 1.4: Spectrum of product support strategies (US DoD Defence Acquisition University, 2018).

As a precaution against to death spiral; Gansler (2000, June 27) proposes expanding partnering arrangements and competitively sourced support between public and private sectors; i.e. partnering and competing organic depot and industry for decreasing the operation and maintenance costs as Gansler says: "In fact, we've been finding savings of more than 30 percent, regardless of whether the winner is the public or the private sector."

1.1.6 Other Important Issues About PBL

1.1.6.1 Optimization of total system availability

The key points of this model of PBL applications are optimization, best use of depots and industry through "Public-Private Partnership"/PPP, and statutory requirements "Optimization of total system availability while minimizing cost and logistics footprint; where the best use of public and private sector capabilities through

government/industry partnering initiatives, in accordance with statutory requirements shall be included in sustainment strategies." It is easily can be noted that; first, "the optimization on the total system availability" becomes a trade-off subject; second, "cost, useful service, and effectiveness" versus "corrosion prevention and mitigation" becomes "win-win" strategy deals; third, the sensitive decision on the details is left to the information owner, i.e., the "Program Manager" (PM) (US DoD, 2003:7, E1.1.17).

1.1.6.2 Adopting civilian standards

US DoD (2003:7. E1.1.16) limits "the use of military specifications and standards to Government-unique requirements only, in other words, the narrow standards of military systems are let to be flexible whenever seems logical, the manufacturers, actually the designers are the item owner, and through PBL that also can be relatively easily developed.

1.1.6.3 IPTs as facilitator

Integrated Product Teams are encouraged by US DoD; "IPTs shall facilitate the management and exchange of program information." (US DoD, 2003:8-9).

1.1.6.4 Government-industry partnering contracts in PBL

5000.01 directive (US DoD, 2003) entitles the weapon system program managers to make contracts with civilian industry in order to apply new "government/industry partnering initiatives, in accordance with statutory requirements" (sustainment strategies); optimization of the total system availability, and trade-off-s among "cost, useful service, and effectiveness" is permitted, while IPTs, "Software Intensive Systems" and "Small Business Participation" is encouraged and incentivized. The main aim of such a method is first minimizing cost and logistics footprint, duration is for the whole life-cycle of the system, second, is to develop and produce new weapon systems (as breaking down the death spiral).

When considering the experienced applications in USA it is seen that, this government-industry partnering contracts are generally between depots and industries; "Almost all DoD support is comprised of a mix of commercial and organic sources. "All Organic support" or "All contract support" strategies are rare." (Cothran, 2007:6).

It should importantly be noticed that, US DoD Directive 5000.01 "The Defense Acquisition System" is not solely about PBL application, but it is a directive about the entire Defense Acquisition System; it "provides management principles and mandatory policies and procedures for managing all acquisition programs" (US DoD, 2003:4). Therefore, the notion there should also be noted that, US DoD Instruction 5000.02 "Operation of the Defense Acquisition System" is also authorized. US DoD Instruction updates the established policy for the management of all the acquisition programs (US DoD, 2003). The date of the Instruction referenced in mentioned Direction was May 12, 2003, it has been changed a few times after then; the latest version as of today (13 May 2017) is February 2, 2017. The main difference is the addition of the cybersecurity issues (US DoD, 2017). Hence, PBL is not applied alone in the US DoD, it is a part of a big policy of transforming the entire US DoD as Gansler (2015a:21) noted.

1.1.6.5 Critical targets of PBL

The Critical Targets in MRO&U field of PBL applications can best be picked up from the controlled documents (such as The Defense Acquisition System Directive 5000.01), and US Code Title 10, which are indications of equilibrium of the main forces of the struggle (Public and private sectors) as well as the updated forms of current situation that is adjusted for maximum outcome of the aimed target of these documents. In addition, after a careful investigation some more has been detected such as OEMs' advantages on successful applications of PBL.

The Directive 5000.01, being a controlled document, which is updated regularly, is a regulation strictly shaping the form of the performance-based activities. Therefore, the Critical Targets of PBL applications can be referred through. The directive first endorses the Acquisition Managers to use performance-based strategies for acquiring and sustaining product and services under the Performance Based Acquisition (PBA) definition by stressing the following situations (US DoD, 2003:7):

1) To maximize the competition, innovation, and interoperability,
2) To enable greater flexibility in capitalizing on commercial technologies,
3) To state contract specifications/requirements in performance terms,
4) To limit the use of the military specifications and standards to government-unique requirements only,

5) To base configuration management decisions on factors that best support implementation of performance-based strategies throughout the product's life cycle.

On the other hand, in the PBL definition (US DoD, 2003:7), the directive endorses the Program Managers:

1) To optimize the total system availability by reducing cost, and logistics footprint,
2) To use trade-off decisions about cost, useful service, and effectiveness,
3) To include best use of public and private sector capabilities to sustain the system.

1.1.7 Risks of PBL

Risks of PBL application in defense logistics; there seems to be two groups of risks associated with application of the PBL in defense logistics in the field of depot level maintenance of aerospace and defense equipment: Operational risks and cost risks.

Doerr, Eaton, and Lewis (2004:4) noticing general measurement issues arising in governmental service outsourcing such as usually happening "in the gaps between governmental objectives and service measurements, and in the contrast between clear profit-centered vendor metrics and more complex mission-oriented governmental metrics". They then draw the attention on to the PBL applications on defense logistics because of "levels of operational risk that are more difficult to measure and more difficult to value than other government services" (Doerr et al., 2004:4).

1.1.8 Performance Based Acquisition

US DoD Directive 5000.01 (US DoD, 2003:7, E1.1.16) directs the acquisition managers to consider and use performance based (PB) strategies for acquisition of products and services or for sustainment of them. Additionally, they are forced again to consider and use PB strategies throughout the life cycle of weapon systems (Performance Based Life cycle product support) and base all configuration management decisions accordingly. The same directive also pushes the

program/product managers to develop and use PB strategies to optimize the total system availability and minimize costs and logistics footprint at the same time.

On the other hand, acquisition managers are pushed to promote the competition so that both the military depots and industry can innovate, reduce cost, and increase the quality. Very interestingly, they are pushed to consider alternatives to reach the equivalent benefits of a competition, in the circumstances of unavailability of competition (US DoD, 2003:5, E1.1.3).

In short, the acquisition managers are directed to use PB strategies for Acquisition and Sustainment, and PMs to use, develop and implement PBL strategies on sustainment. The directive stress on the public-private partnering: "Sustainment strategies shall include the best use of public and private sector capabilities through government/industry partnering initiatives, in accordance with statutory requirements." (US DoD, 2003:7, E1.1.17).

The execution of the PBL strategy is through the PBA contracts. US DoD Directive 5000.01 endorses the acquisition managers to use performance-based strategies throughout the product's life cycle on acquiring and sustaining products and services whenever possible. The main object there is to reduce the costs by maximizing competition, innovation, and interoperability besides facilitating commercial technologies (US DoD, 2003:7).

The directive enforces the acquisition managers to use PBA for almost everything needed beyond the initial contract. The directive encourages commercial technologies, competition, innovation, flexibility, interoperability, and restrains using military specifications and standards to Government-unique requirements only, instead pushes to use the performance terms for contract requirements throughout the products' life cycle, especially through configuration management decisions (US DoD, 2003).

In the following sections, the key terms of PBL will be studied, namely DLM, Title 10 and PPP. First all three will be explained and then Title 10 will be criticized from public vs. private viewpoints in DLM and PPP dimensions.

1.1.9 The Status of Organic DLM Facilities in PBL Applications

There were some coded concepts in the interview data such as 'place and future of the military factories in PBL and its applications'; the position of depots in the PBL

applications where PBL is emerged and improved has already been reviewed, here it will be checked from the government documents.

Public-Private Partnerships for Depot-Level Maintenance (US DoD, 2007) is a US government document, as well as US DoD Guidebook: Public-Private Partnering for Sustainment (US DoD, (2012).) are all about "Depot–Level Maintenance" activities; the Depot Level Maintenance of weapon systems is the focus of the PBL issue as US DoD. Since it involves channeling the financial resources, it is regulated by law: United States Code (USC) Title 10.

Reviewing those terms would be useful at this moment, starting with the definition of the subjective terms.

This is one of the frequently used terms in the literature. It refers to the maintenance capability of the defense equipment that is very critical to be owned by the military department (government) in order to have the weapon always in the required form without needing any help from outside. All the literature turns around this principle. The principle of keeping the military departments independent from outside in the health of their arms (weapons) is guaranteed by some laws that permanent and general ones are sections inside the permanent and general law of Armed Forces; United States Code Title 10.

Per Title 10 of US Code, the term is referred as "depot-level maintenance and repair" and is defined as (10 U.S.C. § 2460):

> ...material maintenance or repair requiring the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies, and the testing and reclamation of equipment as necessary, regardless of the source of funds for the maintenance or repair or the location at which the maintenance or repair is performed. The term includes (1) all aspects of software maintenance classified by the Department of Defense as of July 1, 1995, as depot-level maintenance and repair, and (2) interim contractor support or contractor logistics support (or any similar contractor support), to the extent that such support is for the performance of services described in the preceding sentence.

The expression is so full and inclusive that, what is left behind is needed to be explained and it is indeed explained in the following paragraph under 'exceptions' heading of Section 2460 of US Code Title 10. The exemption is only for those modifications or upgrades that are improving the program's performance or kind of

nuclear fueling, which are very special situations. Hence, it can be said in practice, the "depot-level maintenance and repair" covers everything related to a weapon system.

US Department of Defense Instruction (Number 4151.21, April 25, 2007) is about "Public-Private Partnerships for Depot-Level Maintenance" (US DoD, 2007b). It (US DoD, 2007b) defines 'Depot-level maintenance activity' as:

> A specific US DoD-owned and US DoD-operated facility established equipped, and staffed to carry out depot-level maintenance. US DoD depot-level maintenance activities accomplish a wide range of depot-level maintenance processes including overhaul, conversion, activation, inactivation, renovation, analytical rework, repair, modifications and upgrades, inspection, manufacturing, reclamation, storage, software support, calibration, and technical assistance. Field-level maintenance sites authorized to accomplish a specific depot-level repair or a narrow range of such repairs or maintenance are not depot-level maintenance activities.

Therefore, depot level maintenance activity happens in US DoD facilities by US DoD people (i.e., in organic/government depots, by organic/government people). It is the greatest level maintenance activity; there is not any higher place left that can do better maintenance; it corresponds to and it is equivalent of the producer's up most level maintenance.

The term maintenance is a generic name here to cover all activities that can be done for that specific weapon system, it is so inclusive that the exceptions only added on the next paragraph, which exempt only program improvement or the nuclear fueling as depicted in the definition of the depot-level maintenance and repair in Title 10 (Definition of depot-level maintenance and repair. (1995)).

1.1.10 Legal Statutes, Regulations, and Guidance Affecting PPP on DLM

In US system, Statutes specify what jobs of DLM will be performed by whom and how. It is seen that they are kept under control, which are updated according to the needs and requirements. After PBL, in PPP era, various legal statutes are derived to control and regulate the PPP on DLM, those statutes all have various effects on the resultant DLM by PPP.

1.1.11 'United States Code Title 10—Armed Forces'

According to Office of the Law Revision Counsel of the US House of Representatives (US OLRC) Website (http://uscode.house.gov), United States Code Title 10 is actually made of two previous laws; first the organic law governing the Armed Forces of the United States and providing for the organization of the Department of Defense (the older version of Title 10); including the military departments and the Reserve Components, and second, the law relating to the administration of the National Guard (The previous Title 32). Those previous versions of Titles 10 and 32 were legalized into one law (called new Title 10) by the Armed Forces-Act in August 10, 1956; therefore, it is a positive law codification (1 USC 204). It is a codification of all previous laws that were permanent and of general applicability to the Armed Forces and the National Guard.

The law is organized under five subtitles, as; A- General Military Law, B- Army, C- Navy and Marine, D- Air Force, and E- Reserve Components. Subtitle A contains the laws applicable to the US DoD and to all Armed Forces, where Subtitles B, C and D contain the laws applicable to only addressed active military departments of Armed Forces, and Subtitle E contains all the laws applicable to the Reserve Components.

Each subtitle having four parts underneath: I-Organization and General Military Powers, II-Personnel, III-Training and Education, IV-Service, Supply, and Procurement. The parts that are relevant to DLM are under Subtitle A (that is general to all forces), and under Part IV (that is logistics).

Officially, the Title 10 sections and all United States Code sections can be reached from http://uscode.house.gov/, where currency as well as all the related issues including downloads in various formats (even the prior year versions) can be selectively reached. US OLRC web site presents the most current online versions.

The last print version of Title 10 can be downloaded from GPO web site (https://www.gpo.gov/fdsys/pkg/USCODE-2011-title10/pdf/USCODE-2011-title10.pdf), which has an authentication stamp on the first page of total 2489 pages. The other years print versions also can be downloaded; there is not a print version for year 2014 for example, however still it (as all the supplements added) can be downloaded from US OLRC web site, it is 2638 pages long.

USC Title 10 is the set of the general and permanent laws about the US Armed Forces. It is a live document under control of the US Congress and US House of

Representatives. Therefore, it is a very up to date, contemporary defense concept including details about facilities, personnel, and the way of doing business (reflecting business culture). It is comprehensive; do not leave anything out of control and regulation, that not only FMS but also sales to persons are considered by this section of code title 10 (10 U.S.C. § 2563). The Title 10 is the well-known name of this code, which covers all situations in US Armed Forces, current and valid (applicable) all the time, the legislation analyses beside other feasibilities are deemed important and indispensable. In that sense, the DLM, PPP matters in Title 10 will be examined in the following sections.

The main sections related to 'depot level maintenance and repair' activities that are PBL related are given in DLM and PPP sections of Title 10. ("US OLRC" of the U.S. House of Representatives data has been utilized) below; since the PBL pushed the US Armed Forces to participate with private sector, those sections are naturally related to 'Public-private partnership' matter also.

The Title 10 sections are listed per their enactment dates, so that the events are examined in an historical perspective.

Each section is described as what is it all about and what are the main changes it has passed through; especially the main changes are delineated. The purpose here is not go through a deep analysis for each section but is just to describe the sections in chronological order while stressing the evolution of the PBL in law dimension, as this part will be an introduction type investigation in the thesis.

During this said analysis http://uscode.house.gov/ web site information is utilized; the section references are all cited and listed in general. However, while analyzing the chronological changes, the law sections' versions in several dates are checked back and forth in this web site (such as when checking the 1994 Main Edition (1/4/1995), then 1980 version, then current version etc.), those details are not noted due to first this part is planned to be an introductory section (not a detailed analysis) and second time constraints of this study.

1.1.12 Public-Private Partnership (PPP)

US DoD Instruction 4151.21 (US DoD, 2007b) is about Public-Private Partnerships for Depot-Level Maintenance and defines depot maintenance as (US DoD, 2007b):

> The processes of materiel maintenance or repair involving the overhaul, upgrading, rebuilding, testing, inspection, and reclamation (as necessary) of weapon systems, equipment end items, parts, components, assemblies, and subassemblies. Depot-level maintenance also includes all aspects of software maintenance, the installation of parts or components for modifications, and technical assistance to intermediate maintenance organizations, operational units, and other activities.

To enclose best use of public and private sector capabilities through the public-private partnering according to legal requirements, to sustain the system (US DoD, 2003:7).

US DoD looks for public-private partnership on PBCs.

US DoD encourages OEMs to make partnership with organic depots and manage the repair facilities, modernizing and investments are included.

Importance of PPP in PBL applications in public/private mix sectors:

Public-Private Partnering (PPP); collaboration or cooperation has always become a target for defense managers, in order to use the private minded business techniques in adherently government owned and operated organizations such as military depots. Eckhard Bennewitz[6] (1966), states "The Defense Dept. is continuing its efforts to improve government/industry production planning programs and to weld the various programs into a cohesive package." in the abstract of his article about 'Industrial Readiness Planning for Defense' while trying to outline contractor or government actions for quick response to unforeseen production demands in 1966.

Gansler (2015a:21) at an interview about evaluation of Defense Acquisition Reform mentions two steps on defense industry transformation; first 1980-2000s: a "consolidation of the Defense Industry around 20th Century Needs" period of the defense industry, and then a new period for "transforming to a 21st Century National Security Industrial Structure". Again Gansler, who is the architecture of PBL, (2015a:16, 17, and 31) points out a "civilian-military industrial integration", or with proper terminology 'military civilian industry partnership' (MCIP); in development and manufacturing facilities, in buying commercial, and of course outsourcing (of

[6] Eckhard Bennewitz, then General who is the director of the new Office of Technical Data and Standardization Policy, who was responsible for policies and Defense procedures in the field of technical logistics data acquisition and utilization, including storage and retrieval systems Source: http://webcache.googleusercontent.com/search?q=cache:7YLbGWxDjAsJ:asc.army.mil/docs/pubs/alt/archives/1967/Jan_1967.PDF+&cd=6&hl=tr&ct=clnk&gl=tr), a copy of the html file has been converted into pdf form and saved as "RESE~CH - 1966.pdf".

logistics services to commercial companies) etc. Considering the USA's defense industry's strength, its continuous reforms, and especially the "civil-military partnering" going 1960s or even more before, it might not be wise to adapt all what is been done but understand what is been done. Gansler (2015a) encourages the continuous, smart competition between Public/Private for higher performance at lower costs "at all levels, and for all non-inherently-governmental work" (2015a:21).

The PBL, can be applied solely by military factories alone, theoretically for all systems, it is called "organic PBL" (Gansler & Lucyshyn, 2006:6-7), or hybrid; a combination of both civil and military in any ratios (Gansler & Lucyshyn, 2006).

Berkowitz et al. (2005) are one of the first group of people studying PBL, they see it as an integration of acquisition with sustainment (operation and maintenance) of the system throughout its lifecycle; it may be perceived as integration of manufacturing and maintenance, leaving the use to the user; the bonuses for the contractor is incentives, the tool is performance parameters.

Goure (2010) points out the importance of deciding correctly in favor of insourcing or in favor of partnership, where he uses the term "Performance Based Partnership" (PBP) to denote a partnership between public and private of whom one is the leading partner.

1.1.13 Integrated Product Team (IPT): Introduction to relationship management

Integrated Product and Process Development (IPPD) is an innovative business solution like PBL "... evolved in industry as an outgrowth of efforts such as Concurrent Engineering to improve customer satisfaction and competitiveness in a global economy" in IPPD Handbook (US DoD, 1998:1). It is US DoD's management technique that "...simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. One of the key IPPD tenets is multidisciplinary teamwork through Integrated Product Teams (IPTs)." (US DoD, 1998:1). IPPD, as a multidisciplinary management technique, uses design tools such as modeling and simulation, teams, and best commercial practices to develop products and their related processes concurrently.

IPPD is also used in performance-based contracting (US DoD, 1998:11) especially among the stakeholders of PBC, which is an equivalent term of PBL (used in civilian market as SC. states (2010:4). IPPD, may be useful at all interdisciplinary or inter parties' projects for developing products, and/or processes in an organization or among the organizations and IPTs are universal tools of IPPD (Usgurlu, 2004). Klevan (2005:2, 6, 15) gives a real-life example of IPT's role, and members in a PBL application. Integrated Product Teams' functions in PBL contracts are seen in (Mendoza & Devlin, 2005). IPT is described in Directive 5000.01 (US DoD, 2003) (Para. 3.1.) as the compose of representatives from all the functional disciplines to work together under a team leader to make accomplished and stable programs, detect and solve the matters while streamlining the decision processes by providing strong and live recommendations.

1.2 Comparisons of PBL with TBL and SCM

This section aims PBL's comparison both to conventional military logistics strategy (known as TBL), and to the supply chain applications in civilian world.

1.2.1 Comparison of PBL with TBL

Comparison of Conventional Logistics (Transaction Based Logistics /TBL) with Performance Based Logistics-PBL.

Guajardo et al. (2011) proves by analysis in their two-stage econometric model comparing empirically a traditional Time and Materiel Contract (T&MC) contract and a performance-based contract on the maintenance of same type A/C engine by its manufacturer (Rolls and Royce) that product reliability is 25-40 % higher at PBC case than traditional contract.

Under T&MC, the contractor (service provider) is paid for the repairs when needed (for worked hours X payment/hour) plus the cost of the parts used as spare or consumables), whereas under PBC, the contractor is paid for the reliable flight hours. Hence, rationally as an unpleasant fact, it is normal to expect two distinct acts from the contractors. Under PBC, the contractors will try to investigate the conditions to leverage the reliability since the contractor is encouraged for increasing the reliability while on the T&MC; the reliability issue will not bother the contractor because he will

be paid for the repairs (Guajardo et al., 2011:965). Therefore, the reliability is changing position from ‘no relation’ to ‘related’ according to the type of the contract whether it is T&MC or PBC; which are coded by new definition of the profit that is the goal of private companies.

1.2.2 Comparison of PBL with SCM

Randal (2010, 56) says that PBL can be characterized by knowledge intensive supply chain relationships in service dominant logic (SDL); "PBL is an approach that represents a supply chain application of SDL.". Supply Chain Management" (SCM) is the modern and integrated way of creating cost effective, high valued products to the only financial source of a supply chain (the end user) according to Handfield and Nichols (2002). They define SCM as the integration and management of all the required organizations and the activities to create sophisticated value systems using a quality information sharing, effective business processes and collaborative relationships so that all of the chain organizations benefit from the sustainable competition (Nichols:8).

The block diagram showing the relationships among organizations and activities in an integrated supply chain is seen on Figure 1.5 on next page. As it is seen on the figure, every unit/organization (activity owner/value adder) is a customer and at the same time supplier. And if a supplier is inside of the same organization (of the subject customer), then it is an insourcing/ “make”/ internal type relation, and if the supplier is not inside of the organization, then it is outsourcing, and it is a “buy”/external kind of relation. Relations managed in SCM among all the value adders are at least one or a combination of product, service, funds, knowledge, and information flows. They are all synchronized and arranged according to the high valued production of the customer that is the ultimate result.

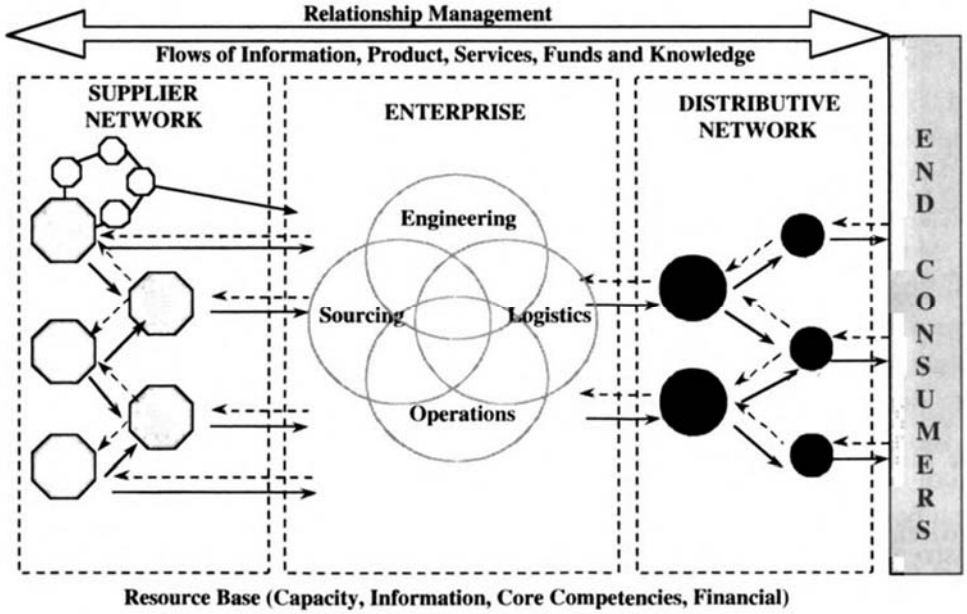

Figure 1.5: The Integrated Supply Chain: The block diagram showing the relationships among organizations and activities (Handfield and Nichols, 2002).

Handfield and Nichols (2002:121-122) state that, if a core competence is outsourced by mistake, then its competitive advantage may be lost. For that reason, the decision makers, the managers responsible from making insourcing or outsourcing determination must be very careful about the core competencies: to understand the organization's true core competencies and their integral parts that need to be made internally. In the similar logic, the military commands need to be very careful on the conditions of PBL, where the contractor may be unable to achieve a service in some critical conditions. Therefore, PBL must start with small non-critical components and develop progressively.

Gansler speak of "world class" services that is currently available in civilian sector logistics, that is undoubtedly superior to organic services (Gansler, 2000, June 27) in his eyes. On the other hand, Wojciechowski (2013) cannot find much difference between TBL and PBL in military logistics, implying even PBL may not be successful bringing that world class service into military logistics. PBL is a new way of business, trying to develop and improve the organic services, while providing an occasion to civilian industry to cooperate with military; it is to improve the service quality and decreasing the cost, at the same time it is an opportunity for civilian sector to access to real conditions where their products are used and what are the weak parts of them that are failing. Knowing the real case is expected to drive them to improve their product within the reached high levels of technology and business. This even is

expected to enhance their new defence equipment development activity. The tricky point is, it is not only one-sided tool, and (US DoDD, 2003:7) states PBL is to be applied by protecting both sides' legislation.

1.3 Reflections of PBL

This section aims to review PBL's reflections in both general (excluding Turkey) and in Turkey.

1.3.1 Private Military and Security Companies

Civilian companies in state roles such as mainly guarding/ logistics/ maintenance services to military systems/weapons in conflict zones start to emerge in 1990s and especially in 2000s; as "Private Military and Security Companies (PMSC)", and defense manufacturing companies are expanding their interest to cover upgrades, technological modifications, training, simulation, and logistics management services over the life cycle of military equipment in those periods (Kurç, 2013:213). A quick literature review shows that, PMSCs still need to improve in order to be accountable, and it can be said defense companies had received partly US government's support by disseminating PBL strategy through directives, that may help to enhance the professionalism of these companies and get matured.

Melzer, (2009:38) defines Private Military and Security Companies as "Contractors that act in 'defence of military personnel and other military objectives against enemy attacks' lose their protection as civilians and become themselves legitimate military targets" (as cited in Schneiker & Krahmann, 2016:2) in their paper prepared for the 52nd Munich Security Conference.

Schneiker & Krahmann (2016:3, 4) notes that in Iraq and Afghanistan, "more than 250,000 military and security contractors were involved in the provision of services such as armed protection, military logistics, maintenance and repair, training of local armed and police forces, election monitoring, and reconstruction." and the number of private security guards employed by the U.S. military increased ten times from 2008 to 2012 (2,745 to 28,686 respectively).

Calazans (2016) states that the private actors have always seen in wars at all ages, and now especially with high technological devices and systems it is getting

popular again, and sees “the privatization of the military functions of the state” as “the most radical form of privatization” (Calazans, 2016:20, 35).

Although it is not crystal clear on the studies, about the difference in the positions of logisticians (technical people) and mercenaries (operational people) from the legal standpoint, there are discussions about the PMSC (contractor) personnel’s statutes in war or crises as being legitimate targets. The current US law and policies limiting civilian contractor activities in war or crises since the lack of direct and adequate legal legislations protecting them yet (Debarre, 2015).

Schneiker & Krahmann (2016:10) notes the inadequacy of the mechanisms for PMSC and proposes the governments and international organizations to improve the transparency, accountability, and control of the industry from choosing to controlling the company. The sophisticated weapon/defense systems make their operation as well as maintenance procedures also complicated, therefore today the governments have one of the two ways to choose from: either they will go with private companies either through direct contracting per mission, or lifecycle contracting as PBL, or hybrid solutions where both organic and private are used in a collaborative and competitive manner, the conventional way of supplying logistics services through GOGO organizations need to be diversified. However in all of these choices one thing seems to be definitely a must; governments need to maintain a core logistics capability to secure the contingencies and emergency requirements of national defence (Lockheed Martin Pres., 2014:97) and as (Bakar et al., 2012:44) states that, today, more than at all times, government need technical experts; a stronger engineering cadre. As a natural consequence; to ensure to manage all of these risks, governments need to employ the best technical, contractual and quality assurance people in government's cadre to arrange and manage those requirements.

1.3.2 PBL Applications in Other Sectors/Countries

There are several PBL applications in other sectors and other countries like; some of them are mentioned below as sample applications from around. Performance-Based strategies have found place in use in several industries especially after 2000s such as defense, manufacturing, healthcare, roads, transportation etc. (Randall et al., 2015:213, Table 1). Other than USA, where the PBL was emerged, UK, Germany,

France, and Australia are the users of the PBL and are examined by UDI (MoND Undersecretariat for Defense Industries, 2013:27).

Australian Commonwealth Government mandates PBC (PBL) methods (as USA government) in order to lower the acquisition and through life cycle support costs; Pozzetti, A., Bil, C., & Clark, G. (2013:303) claim that it is accepted as the purchase of the outcomes, not as acquisition of product or services. The government document 'Performance Based Contracting Handbook; Guiding Principles and Performance Framework' is a quite well detailed tool for defense acquisitions prepared by Australian government to be used in aerospace systems acquisitions (Commonwealth of Australia, Defence Materiel Organization, 2007).

The visions of both the first version (September 2005) and second version (February 2007) are same; inviting the industry partners for assisting in the business with the government division. The reward is directly related to the level of performance on outcomes delivered not to the works performed, which also indicates the longer duration of the contracts. Four types of contracts are described in application: 1. Through Life Support (TLS) Contracts, 2. Contracted Maintenance (CM) Support Contracts, 3. Repairable Item (RI) Support Contract and 4. Aero Engine Support Contracts. The book helps and guides to develop a standard PBC/PBL framework.

Some of the key principles that will be applied in all contracts are defined in the handbook are: Achievement of value for the money contractual outcomes for the government (that recalls the availability of archived cost data about the previous terms for the considered weapon systems). Existence of 'expectation' on either 'continued performance improvement' and/or 'reduced cost of ownership over the life (cycle) of the contract' in return for longer term contracts. The overall profit is related to the risk level involved. The level of profit is linked to an agreed level of performance. The government has the right to terminate the contract in whole or part in the case of low-level performance consistently. The following determinations can be concluded from the document also: Engineering services, support contracts are not prepared yet. (Commonwealth of Australia, Defence Materiel Organization, 2007).

Two study was came across from Norway, both are master thesis on PBL application (adoption in this research context); Håbjørg (2015) reveals the enablers and barriers in an inductive method study to successful implementation of

Performance-based logistics in the Norwegian Armed Forces; identifies 10 factors: information sharing and relational trust between customer and supplier as enabler, the lack of proper focus on Supply Chain Management/SCM as a barrier; economy (funding), readiness, competence and PBL awareness, complexity, strategy and regulatory requirements are context dependent (could be both barrier or enabler). The thesis compares the Norwegian PBL experiences to similar research in USA, Great Britain and Germany. In several cases the Norwegian experiences deviate from comparable research results in other countries.

In the other study from Norway, Lund (2016), interpreting PBL as a civilian logistics concept adaptation to military for cost saving purposes, and sees PBL as a long-term partnership between the private industry and the military for the benefit of both parties. His "... conclusion is that the Armed Forces do not have a clear strategy for how to introduce performance-based logistics as a concept", besides they suffer not to have any expertise, and could not developed any strategy to gain expertise. Additionally, partly because of the skepticism in the military to include civil partners in the logistics chain, particularly in relation to military operations, the roles, responsibilities, and authority are uncertain in PBL. "The political guidelines are unclear and provide a lack of direction. The combination of lack of competence and unclear requirements provides standstill."[7].

1.3.3 Review of The Literature Relevant to Adopting PBL In Turkey

PBL or PBL Related empirical studies about Turkey are scanned through the literature and reviewed.

Türen (2008) is the first author of a doctoral dissertation about an empirical research study investigating the relationship between economic and managerial incentives and disincentives of the logistics outsourcing intention of the logistics professionals of a military unit in Turkey. Later Türen, U., & Sennaroğlu, B. (2008). Türen defines the military outsourcing on logistics by its benefits and threats; which are based on the unit and the conditions/environment it is (going to be) used. Expecting the Turkish Army start with outsourcing logistics after completing reorganization and downsizing (to focus into its core competencies by reducing costs and increasing

[7] The Norwegian studies showed that, there is a gap in literature on how to adopt the PBL in a sustainable and beneficial way, in that context this study may contribute to fill that gap.

efficiency) argues that; incentives and disincentives need to be taken into consideration very carefully for every unique outsourcing possibility (Türen, 2008:86). He claims the second most dangerous situation is the threat of hollowing out the existing capabilities, which results from losing all or some of main combat service support by time after outsourcing them to private logistics service provider(s), since it could be very difficult to reestablish again those capabilities (Türen, 2008:84).

Aykul (2006) and Türen (2008) both worked on Army logistics (Turkish Land Forces); both are examining outsourcing and both suggesting that careful and wise applications will provide benefits economically as well as time wise. The codes of careful and wise application of outsource are; to make precise decisions on what to outsource, to develop national firms, and adjusting rules and regulations to adjust the civilian firms to serve for military systems in war conditions also as well as in peace time. Being careful not to lose all the core competencies completely as it would be very difficult to regain those capabilities back and close the hollow outs again, and education together with having the conditions of continuous development are also important.

Karaosmanoğlu (2010) has dealt with Logistics Support Analysis (LSA) mainly, He mentions of PBL and gave a description in one paragraph; " Performance Based Logistics is the purchase of product support to ensure that a product achieves its performance goals and optimizes system readiness is integrated into the system through long-term support agreements, with clear authority and responsibilities.[8]" he is the first Turkish author mentioning PBL in a study.

Bayram (2010) and Timur (2013), both have worked on PBL on their theses. Bayram was the first author studying PBL, saw the PBL as a very useful method, searched what needs to be adapted to apply PBL as a national public acquisition method. His answer was inclusive of modifications on Turkish Acquisition Legislation system together with organizational-cultural change. The change from “the lowest price” to “the performance output” or with other words from quantitative measures to qualitative measures was requiring, “empowering the PBL teams” which works during all the PBL contract instead of “Bids evaluation boards” that is functional only during

[8] The original definition of Karaosmanoğlu (2010) is: "Performansa Dayalı Lojistik bir ürünün performans hedeflerine ulaşması ve sistem hazır bulunuşluluğunun optimize edilmesi için sağlanacak ürün desteğinin, otorite ve sorumluluklar net olacak şekilde, uzun dönemli destek antlaşmaları yoluyla sisteme entegre şekilde satın alınmasıdır."

the bidding period. On the other hand, Timur pointed out practical issues of PBL applications in commercial companies and studied a hypothetical example throughout all the steps of PBL preparation, and he tested the PBL preparedness of the personnel and suggested some trainings and other recommendations. The second PBL thesis was also very useful especially for the Turkish literature.

Army Stryker is common weapon system that are examined by both Quick (2011) and Denizer (2007); Büyükgüral (2009) goes to the gap he finds: developing a tool model for evaluating the success level of the individual metrics and overall PBL during contract evaluation and management. Yükselen (2012) on the other hand, states that PBL is the most preferred and mandated strategy in US DoD, focuses on the criteria for the appropriateness of selecting the PBL on a specific need, and builds a four-step assessment tool for the decision makers and business case analyzers.

Focusing to the applicability issue of PBL in nonwestern countries (including Turkey), Cebeci wonders if PBL can be applied in those kinds of countries. The answer he discovers is; yes, and although there may be some difficulties such as culture differences, language barriers, and business/work ethics etc. these could be exceeded via trainings, effective communication etc.

Özdemir (2016) has built a model that is usable to identify if a defence acquisition is a PBL implementation or not, and to define the minimum ontological criteria to apply it as a PBL contract.

The contributions are very valuable in several aspects of applying the PBL, however the gap in adoption of PBL is remains open, hence this study can fill that gap, contributing both to the literature and besides it can be useful in feasibilities of adopting PBL in Turkey, as well as in the other countries in similar context.

1.3.4 Ongoing Projects and Programs Relevant to PBL In Turkey

Some of the ongoing projects and programs that are relevant to PBL directly or indirectly are discussed in this section. In that respect CN-235 and F-35 are discussed as success story of 2nd and 1st Air Supply and Maintenance Center (ASMC)s. Both are foreign made systems that Turkish organic military facilities (ASMCs) have gained certified capabilities that can provide maintenance services to foreign countries.

CN-235: Turkey uses her own advantages that brings new horizons in aerospace and defense. An organic military factory of the Turkish Air Force (TURAF), the Air

Supply and Maintenance Center in Kayseri became the regional maintenance center of CN-235 transport aircraft by signing a letter of intent with Airbus on May 6th, 2015. It is the result of a successful background in maintenance, repair, overhaul, and updating of the CN-235 aircraft of Airbus (Galland, 2015).

Joint Strike Fighter (F-35 aircraft, or shortly JSF): PBL came to Turkey through TURAF with F-35 project (Babaoğlu, 2008)[9]. It is the multinational co-production project (See Figure 1.6). Turkey signed the Memorandum of Understanding (MOU) document for "Production, Sustainment and Follow on Development", to gain F-35's engine manufacturing and maintenance capability and became one of the producing countries of F-35 that started as being a partner in design, development, and production phases. Turkey expected to get at least 50 percent offset (return of investment around in total 10.5 billion US dollar) as new defense industry capabilities in country (MoND UDI, 2007). The work sharing is arranged according to the Offset agreements; PBL concept applied here on the geographically distributed authorized service providers and customers. Therefore, a nation with a certified maintenance capability can only provide service to its area according to the PBL contracts. The JSF Program Office (JPO) and US DoD Undersecretariat for Acquisition, Technology, and logistics are convinced by the experience, expertise and cost effectiveness of Eskişehir organic military factory (1st ASMC) among the rivals and this result is achieved. The first three years (2018-2020), Turkey will be the only MRO&U center, and it is believed that the competence will be achieved that means quite a good advantage for Turkey to prepare to the competition to be starting after three years. Turkey will get her first two aircrafts in 2018 according to the existing plans. After three years of being the first and only engine MRO&U center, Norway and the Netherlands also will establish an additional engine MRO&U centers, and the accreditations of these centers will be evaluated every five years (MoND, 2014b).

The assignments were made on the existing capabilities' evaluation and subject to updates in five years. The new assignments about these or new MRO&U capabilities

[9] The modern technology brought by the F-35 aircraft and the performance-based logistics system, a new logistics application for us, have also triggered important restructuring and infrastructure work within the Turkish Air Force. General Babaoğlu, saying the studies started for opening the existing facilities and infrastructure of Aviation Maintenance and Supply Center Commands; with their high experiences in aviation infrastructure and systems engineering, to defense industry companies; "as a result of the completion of these activities, the defense industry will have the common use of the possibilities of the state and civilian sector as in the developed countries, and a synergy will be created."

on new components and systems are expected to any of the partners and Foreign Military Sales (FMS) customers as F-35 global sustainment solutions as F-35 presence enlarges (Lockheed Martin Pres., 2014) and (UTC, 2014). In the pacific region, Japan and Australia respectively. (F-35, News, 2014). Turkey now currently produces several airframe and engine components of the aircraft and was assigned by US DoD as the center for engine MRO&U in European region. Turkey will provide heavy maintenance and repair services to all the European countries in the region as sole center for three years.

Figure 1.6: F-35 Aircraft in hangar (Lockheed Martin is the manufacturer, the picture is taken from wikimedia.org, the license: (CC BY-SA 3.0) by creativecommons.org; Retrieved Feb. 15, 2018 from https://upload.wikimedia.org/wikipedia/commons/c/c3/F-35_in_hangar.jpg).

Integrated product support (IPS), and Public-Private collaboration: F-35, through the Autonomic Logistics Information System (of JSF aircraft) ALIS, is promising a very close teamwork on a daily basis between the US, as the host of this project having the main contractor of the projected aircraft and the participating/user nations. The relationships in this SCM will be controlled by the main contractor through its partners in other nations.

One can easily infer that military logistics of F-35, in the management and control of private manufacturer company (Lockheed Martin) as PBL contractor, collaborating the globally located, autonomously governed by a sophisticated special information system (ALIS), and world class supplier network that consists of military users and even organic MRO&U facilities under control of civilian (private) firms may

and probably will compete today's world-class civilian logistics/Supply Chains; reaching new classes of standards.

The F-35's world-class supplier network helps develop high technology skills and create jobs throughout the world (F-35, Sustainment, 2014).

The F-35 is the latest developed 5th generation aircraft, it has all the latest innovations of aviation; its operational readiness, reliability, and maintainability, streamlined and automated logistics are unequaled. Its maintenance is simple and easy, the footprint of logistics is reduced, and the support equipment requirements are reduced (F-35, Assets, 2014).

F-35 offers with other words requires maintenance, repair, overhaul, and upgrade/MRO&U capability globally in order to support the geographical fleets. Instead of sending broken equipment back to the original manufacturer for repair or maintenance (or modification or upgrades), the concept of having regional MRO&U capability centers (Commercial maintenance centers) all around the globe where the aircrafts are deployed is chosen. The geographical MRO&U centers including warehousing, airframe, component, and support equipment maintenance centers are key to the sustainment of F-35. Warehousing should cover storage and management of all parts. Warehouses are part of F-35 global SCM; parts may be recalled globally.

1.4 Turkish Defense Industry

This section aims to review the Turkish defence sector consisting of both public and private sides.

1.4.1 History

Asimov (1991) points the beginning of warfare as between 10,000 to 8,000 B.C., just after the end of ice age, and together with beginning of agriculture. It is before bronze age, before writing, before history. The city states, nations, empires come after warfare's start. History is a record of civilizations or wars then. Armies are indispensable for civilizations for security, and for survivability for more than 10,000 years; and the arms, attack and defense systems gain outmost importance in armies, so does having them ready when they are needed.

When considering the conditions of finding the correct material and processing it, it may easily be presumed that sustainment of an arm is much more important than obtaining a new one. It is like, maintenance of arms required for survivability, production and use of new arms is a must for being a leader.

Turkish defense industry of today, connected to the Ottoman Empire in history in its closest chain; with the most developed cannon cast, and shipyards of time, İstanbul were the most powerful weaponry of the period. Then Europeans became the leader, and Ottomans lost the World War (WW) I after losing the leading position in weaponry at the end of 17th century and losing all of the technological and industrial capability in the following periods. During the War of independence, some equipment was carried to Ankara by Mustafa Kemal's instruction; became the most valuable support of the army (SASAD, n.d.a).

The early years of Republic, not only defense but no industry was existed in the country as inheritance. A Turkish model of industrialization was internalized, and basic industrialization has started on sugar, textile, mining, iron, steel. Railroads for transportation, banks for finance, cooperatives for agriculture, and then General Directorate of Military Factories have been founded. (SASAD, n.d.a.; MoND, 2017c; Yalçın, 2013).

When Mustafa Kemal Atatürk died in 1938, the young Republic had almost all the weapon factories in the country, including state and private owned aircraft manufacturing factories, shipyards, artillery, gun, and all the ammunitions, and gas masks factories. Several growth and shrinkages are seen till 1947: Truman Doctrine; the military aid against the communism, and 1948-1952: Marshall Plan; aid for recovery after WW II, and 1952: joining the NATO was enough to terminating the young defense industry in Turkey. Turkey had the military equipment of friendly and allied countries, but in using that equipment in Cyprus crises in 1964 became an issue, and USA and other allies raised difficulties for such use. In 1965 and in 1970, Turkish Naval Forces and Turkish Air Forces support foundations established respectively to build ships and aircraft. Following the establishment of Turkish Land Forces Support Foundation after the embargo in 1974, against the Cyprus operation; Parliament approved laws for continuous income to these foundations. Aselsan (1975), İşbir (1979), Aspilsan (1981) and Havelsan (1982) are established (SASAD, n.d.a; TAFF, 2017).

Undersecretariat of Defence Industries (SSM) were established in 1989 by reorganizing Defense Industry Development and Supporting Administration (Savunma Sanayii Geliştirme ve Destekleme İdaresi Başkanlığı) (in 1985 under law 3238); aiming to develop a modern defence industry, and to modernize the equipment of Turkish Armed Forces. Turkish Aerospace Industries, Inc.- TAI (1984), TUSAŞ Engine Industries, Inc.- TEI (1985), Microwave Electronic Systems Inc.- MiKES (1987), FNSS (1988), Marconi Komunikasyon (1989), Thomson-Tekfen Radar (1990) were established; there are foreign capital shares in these entities but some of the shares were bought later by SSM and Turkish Armed Forces Support Foundation - shortly Turkish Armed Forces Foundation - (TAFF). Otokar, Mercedes, BMC, Nurol Makina, which are private companies, started to involve in defense production also, and Roketsan (1989) was founded as a private enterprise. (SASAD, n.d.b; MoND UDI., 2017c).

Turkish Armed Forces Foundation's objective is strengthening the war capabilities of the armed forces by developing local industry and by getting citizens' support (TAFF, 2017). The foundation is a public organization that can work as a private company; in that context, the foundation organizations are dynamic companies that are big advantages, assuming they are well managed.

Till today, Turkish Defense Industry is developing continuously, 'F-16 (1987), Armed Personnel Carrier (1988), Mobile Radar Complex (1990), Electronic Warfare Equipment for F-16, HF/SSB Radios, CASA Light Transport Aircraft (1991)', and 'European Co-production Program for Stinger Missiles' (SASAD, n.d.a) are some of the primary defense projects that were realized in Turkey. And today, SASAD has around 170 members defense industry companies (SASAD, n.d.a); Aselsan and TAI are in the top 100 for 2016 (Clevenger, 2016), Turkish defense industry today producing modern systems as a subcontractor or alone (See Figure 1.6, and Figure 1.7).

1.4.2 Entities and Organizations

The primary entities of Turkish Defense Industries as listed by Undersecretariat for Defence Industries is illustrated in the Table 1.2 on next page.

Table 1.2: Turkish defense industries nomenclature (MoND UDI, 2016b).

	PUBLIC CORPORATIONS		PRIVATE COMPANIES	JOINT VENTURES
	MILITARY FACTORIES	GOV'T CONTROLLED		
AIR PLATFORM	ESKİŞEHİR 1. HİBM KAYSERİ 2 HİBM	TAI	BAYKAR MAKİNA; BÜYÜKMIHÇI; KALEKALIP; GLOBAL TEKNİK	TUSAŞ MOTOR (TEI); ALP AVIATION
LAND PLATFORMS	ARİFİYE, TUZLA & KAYSERİ FACTORIES	MKEK; ASELSAN	OTOKAR; BMC; HEMA; NUROL; KOLUMAN;	FNSS; MTU-TR
NAVAL PLATFORMS	GÖLCÜK, İSTANBUL, İZMİR SHIPYARDS	TURKISH NAVAL SEC.	YONCA-ONUK; RMK; SEDEF; DEARSAN; ARES YACHT; ATLAS-MAVİ; MEGE TEKNOLOJİ; A.D.İ.K	N/A
ELECTRONICS/ SOFTWARE	ANKARA 3. HİBM KKK 4. MAINTENANCE CENTERS	ASELSAN; HAVELSAN; STM; MİKES; EHSİM; HTR; TÜBİTAK UEKAE; TÜBİTAK MAM; ALTAY	GATE; MİLSOFT; SAVRONİK; SDT; VESTEL SAVUNMA; KOÇ SAV; METEKSAN SAVUNMA; C2TECH; KALETRON; ANTENSAN; YÜKSEK TEKNOLOJİ; AKSA TEKNOLOJİ; ELEKTROLAND; YÜKSEL SAVUNMA; ALTAY; BTT LTD.; FOTONIKS	AYESAŞ; SELEX; NETAŞ; SIEMENS; ESDAŞ; YALTES
ROCKETS-MISSILES-AMMUNITION	KKK 3. MAINTENANCE CENTER KAYSERİ 2. HİBM ANKARA 3. HİBM	MKEK; ROKETSAN; TAPASAN; TÜBİTAK SAGE	BARIŞ; KALEKALIP; TİSAŞ; GİRSAN; SARSILMAZ; SAMSUN YURT SAVUNMA SANAYİ VE TİCARET A.Ş ; TURAÇ DIŞ TİCARET LTD. ŞTİ. ;	STOEGER
LOGISTICS	MILITARY CLOTHING FACTORIES	ASPILSAN	YAKUPOĞLU; ÖZTİRYAKİLER; TARGET; ÖZTEK; TEKSAV; ANEL; MEGETEKNİK	

The Turkish Defense Logistics mainly composed of organic military factories (organic depots focused to the maintenance needs of its own Force Command(s)), State factories (MKE), Foundation Companies (Aselsan, Havelsan, MİKES, ROKETSAN, Turkish Aerospace Industries (TAI)), Private companies (Alp Aviation, Ayesaş, Fokker Elmo, Kale Aerospace, Vestel,), Small Businesses (KOBİs), Institutions and Universities (TÜBİTAK, TÜBİTAK-SAGE, Technoparks, Universities) as depicted in Table 1.2 above.

Figure 1.7: ANKA, Advanced medium altitude long endurance (MALE) Class Unmanned Aerial System of TAI Inc. (Source: https://www.tai.com.tr/en/product/anka-multi-role-isr-system).

Turkish Defense Industry main entities that are member of Defence Industry Manufacturers Association-SASAD, are seen from the table above. Public corporations form the main corner stones of the defense industries. Specialties are grouped under the Land, naval and air platform, then electronics/software, rockets-missiles-ammunition, and general support (called logistics) sectors, while according to the ownership they are classified as publicly owned military factories and government-controlled corporations, then private companies, and joint ventures. The URLs of these industries are also kept hyperlinked as of April 2016, (MoND UDI, 2016b).

The oldest Turkish Defense industry in that table goes back to 1921 the first years of Republic when the General Directorate of Military Factories was formed in 1921 to produce ammunition and aviation. In fact, the history of Turkish Defence Industry extends to the Ottoman Empire that the cannons cast in İstanbul was known as the most powerful one of the time. The private sectors history matches with Republic, the first one dates 1930; Nuri Killigil's 81 mm mortar and its ammunition factory. The first Turkish airplane is VECIHI K V. in 1925, which was designed, produced, and flew in Turkish Air Force, and in 1939, Nuri Demirağ built the first private airplane factory in İstanbul. Today, in addition to military, and government controlled public factories, there are local private companies as well as joint ventures. The special dates in Turkish Defence Industry are first 1974, when Cyprus Operation of Turkish Armed Forces, which USA applied embargo, caused to start defense

industry of its own, and in 1989, when Undersecretariat of Defence Industries was formed, it was the beginning of the big projects (SASAD, n.d.a).

Bidding and contracting culture and industry of Turkey in weapons maintenance: Bidding and contracting is the main course of getting parts or services in government; so, that even the MRO&U services provided by the organic military factories, the materials are procured through the bidding competitions. This is a classical way in defense sector for many years and even the organic military factories are used to this model and they take the contracts in competitions with themselves too (Since the capabilities may be gained in different geographical locations for several reasons, they compete each other. However, in Turkey, this is not the case, because of several reasons like; there may not be several military factories on the same capability (since the number of the defense/weapon systems are not much enough), or there may not be a valid and settled cost calculation, accounting, registering, controlling, and managing infrastructure besides lack of an appropriate culture. If the system in USA were named as bidding and contracts system, it would not be wrong, whereas in Turkey, except parts there is not much experience, infrastructure, and developed culture to make and manage defence contracts of current weapon systems. In addition to that, in Turkey, it is also not easy to find not enough number of but any suppliers at all in most of the special/or military technological fields. Turkey's military system has started to develop after the second half of the 1970s after Cyprus war and especially after second half of 1980s.

Adaptation requires a very delicate analyses and careful programming period for preparation, even, with a well-developed, sophisticated infrastructure that having all the appropriate cultural, collaboration facilitators such as USAF has, it may not be possible to get what is expected from a program; Chenoweth et al. (2012) say, in the search of lowering the costs of logistics while improving the quality and performance of the parts/spares and depot/factory level maintenance services they are buying, USAF tried to get the benefits that private sector is getting recently from "Supplier Relationship Management" (SRM) but could not. Chenoweth et al. point out that, although USAF Air Force Materiel Command tried to implement the best practices of SRM, some obstacles prevented them from reaching the benefits, therefore now it is time to address those obstacles.

Law system in Turkey: The law and justice structure about the business systems are also proportionally developed (still developing) in Turkey; hence, there is not any known law like Title 10 of U.S.C. defending the organic military factories against privatization or closing, or protecting them as a measure of national security, which is very developed, kept updated by US Congress. The laws may need to be examined carefully through the PBL applications and be updated.

OEMs are more advantageous in PBL than ordinary service providers are. Guajardo et al. (2011:964) conclude that it is quite normal, the OEMs are most suitable for the MRO&U service provision because of the highly complex and customized nature of these systems, which makes it almost impossible for the third parties to compete in.

US DoD fosters PBCs with OEMs: C-17 is unique by being the first weapon system that has been subject to contractor logistics support on both under "transaction-based logistics" and "performance-based logistics" systems, where the contractor was OEM of C-17 aircraft that is Boeing. On the second type of contract in 2001, Boeing as "Product Support Integrator" (PSI), was responsible for the SCM for all subsystems of the aircraft, hence Boeing make PBL type contracts with its suppliers. Even those second-tier suppliers make PBL contracts with their suppliers, which are counted as third tier suppliers. Boeing, performs the C-17 aircraft's maintenance on both his facilities in Texas and in US Air Force's organic depots in Georgia. This, simple looking sophisticated system of PBL contracts enables Boeing to satisfy the performance criteria of his own contract which is indeed the warfighter's need; with a superior system while minimizing the cost spend on maintenance or the logistics support requirements (Quick, 2011:74-75).

Quick makes three case studies in his dissertation; in addition to the C-17, the second and third cases were Stryker (Eight wheeled combat vehicle of Army) and F/A-18 (super hornet of Navy). The last two are also PBL contracts and made by the OEMs of the weapon systems' in 2001. These last mentioned two PBL contracts were also success stories and in all three examples, although they are all unique in their PBL contract conditions, the main contractor has a PSI role, which positively affects the success of PBL contracts. Quick mentions one case that when the PSI passes to the organic depots (military factories) from OEM, (here on Stryker, PSI passes to organic

depots from General Dynamics Land Systems); it negatively affects the readiness and cost reduction performances of the contracts (Quick, 2011:72-76).

The former undersecretary of defense industry, in an interview to a TV program (Bayar, 2012:t. 1:10:01) says:

> We started to deal with logistics also on this last period; it is a new progress, where the main weapon systems started to be products of our domestic defense industry. It is a new concept on logistics we study now. If the main weapon system is manufactured in Turkey; like ATAK helicopter, ANKA UAV, MiLGEM warship, ALTAY tank, or KiRPi MRAP carrier, then the manufacturer can give the maintenance service. And therefore, it shall provide the logistics support of that system; Turkish Armed Forces (TAF) should not invest for any organic maintenance capability, whereas when the systems were bought from foreign manufacturers it was compulsory for the TAF to establish a maintenance capability of that system, it is different.

The OEMs (the main platform/system manufacturers; here the foundation organizations) need to prepare themselves to collaborate with military factories through the PPP based PBL contracts to find solutions to the problems of military factories currently have in the sustainment of the systems in the inventory, instead of undertaking some or whole maintenance and systems engineering tasks they are successfully achieving for years. This act, will be very fruitful; giving innovative solutions for better (quicker and more economically) sustainment to the systems of force commands, while enhancing the foundation organizations experience on the field so that they can design and manufacture the next generation systems that force commands are in the need by close coordination with both maintenance and operational information. The integration of (especially) local or domestic small business into the technology partnerships, will facilitate the development of the innovative solutions while maturing the national defence industry. It should be noted that, maintenance at whole or at part of critical (core) capabilities in the hands of noncombatants may injure or risk the defence, while partnering on technological branches will bring the new horizons to both maintenance and manufacturing industry, benefitting all the stakeholders; USA, is strong evidence of this fact. Commercialization of the maintenance services could be other partnering target, that may provide new markets in military systems maintenance when domestic new

civilian initiations in maintenance starts; then the core capabilities of the organic facilities can be revised and be formulated according to the conditions.

1.4.3 Defence Expenditures

This study would be deficient if its effect on the economy is not examined. After the end of cold war, the trend of military expenditures decreases in the world and reaches its nadir in 1995-1997 (SIPRI, 2015a). It starts to rise again and with additional effect of September 11, 2001, it reaches to its peaks in 2011 and starts to decrease there. World military expenditure fell by 0.4% from 2013 in 2014, third consecutive year of falling global spending; USA decreased 6.5% to $650 billion while China ($216 billion), Russia, and Saudi Arabia continued to increase. (SIPRI, 2015b, Figure 1) Turkey, besides USA is also one of the countries trying cut down the military spending; Turkey has fallen down one step back in year 2014 in the list from 14th ($22.6 billion; share in GDP: 2.2%, share in Government spending: 5.9% in 2013) to 15th place (share in GDP: 2.2%, share in Government spending: 5.8% in 2014) (AA, 2015), and (SIPRI, 2014).

Turkey's military expenditure was around $18 billion in 2012, It correspond to 2.3% of GDP and 6.2 % of all government spending, it was around $22 billion in 2014; it is 2.2% of GDP and 5.8% of all government spending (SIPRI, 2015a, Current USD/Share of GDP/Share of Government spending; The World Factbook, 2015). Turkey's place (according to the SIPRI values) among the countries with largest military expenditures in the world varies between 12th and 18th between the years 1972 to 2013; the government's policy is to draw it down around 16s (Gutenberg, 2015). When considering the peaks in military expenditures (as 4.1 of GDP in years 1994, 1996, and 1997; (9.0% of all government expending in 2002) it is clearly seen that the share of the military expenditure of Turkey either in total government spending or in GDP are getting smaller each and every year (Kobal, 2014) and (SIPRI, 2015b). Turkey's military expenditures tend to down especially after 2002 when looked at terms of GDP between 1988 and 2009 (Beriş, 2012:24), it is around 1.52% of GDP between 2013 – 2017 (June) years according to NATO (2017:8, Table 3).

As an overview, after the end of cold war the military expenditures of world totals (in 2015 USD) has shown a sharp fall (14%) in 1991 when compared to 1990. The expenditures of 1990 are caught after 15 years in 2005, and it is still in an

increasing mode. On the other hand, Turkey's military expenditures are doubled from 1988 to 1998, reached a peak in 1999, and then a decreasing mode is seen, and in 2005 it is reached a deep with a (26%) decrease from 1999. After then, the military expenditures of Turkey follow a steadier change with some decreases and increases in 2015 USD terms. In GDP terms, the peak in military expenditures are seen in 1996 and 1997 with 4.1%; in 2004 it starts to decrease and as 2016 it is around 2.0% (SIPRI, 2017). The defence expenditures in terms of share of GDP in years 1960-2016 are seen in Figure 1.8 below.

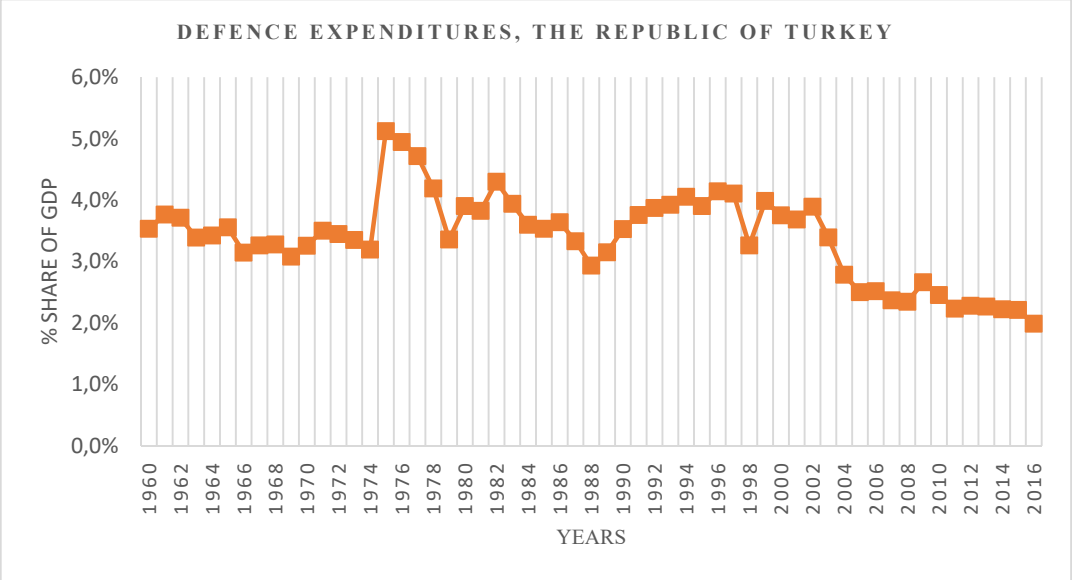

Figure 1.8: The defence expenditures of Turkey in terms of share of GDP, between years 1960 and 2016 (Adapted from data of SIPRI, 2017).

As it is seen from the figure, the defence expenditures in terms of share in GDP, are seen taken under control after 2002; it can be interpreted as the time of getting the results of long journey that started in 1974 to establish national defence manufacturing sector.

1.5 Grounded Theory

In this section, GT is reviewed; GT discovery, GT approach is described, the advantages, different main approaches in GTM, appropriateness of the chosen

approach are explained and lastly, the PBL studies performed by utilizing GTM are exemplified[10].

1.5.1 Emergence and Evolution

G.T. Discovery: The grounded theory, which is also known as generation of theory from data was discovered by Glaser & Strauss (1967). From their preface in their book (Glaser & Straus, 2006:viii) it is understood that, until then the sociology writings were mostly about testing the hypothesis/theories that having little relevance to research subject since generating new theories were not easy; hence, until then, researchers' efforts were to improve the methodology of verification. Glaser & Strauss make an emphasis on issues of sampling, coding, conceptual formulation, construction of hypotheses, and presentation of evidences. They lastly denote that it can be used everywhere; political, educational, economic, industrial if the study is based on qualitative data. It is quite different from conventional methods; it is especially a milestone for sociological sciences; taking it into new dimensions of generating theory or Theoretical Framework.

Strauss & Corbin (2015:275) states grounded theory as "... a general methodology, a way of thinking about and conceptualizing data...".

The grounded theory provides the process and procedures to construct the theory grounded in the data. After the coding, among the categories, there should be one that stands above among the other categories and somehow connects/integrates the all and explain the whole; it is the core, and theory that later may be used (to verify) by quantitative research methods (Corbin & Strauss, 2015:11-13).

Resistance to GTM: Flick (2009:49) notes the resistance to GT at the early years just after 1960's, that still can be experienced. The grand theories or system theories at one end and Grounded theory at the other that is trendy new tool to explain the social issues.

Conventional theory building and GTM: Maxwell (2012:49) notes that both theories that is the one that conceptually developed from the literature data ("existing

[10] The Grounded Theory, in Turkish Terminology: In Turkish literature, the term "Grounded Theory" is seen in several forms, some examples are "kuram oluşturma" (Yıldırım & Şimşek, 2005, Creswell, 2016), "gömülü kuram" (and mentions of "temelli kuram") (Gürbüz & Şahin, 2017:420). In addition to these three terms, "gömülü teori", "topraklanmış teori"; "kökenindeki kuram" can also be came across.

theory", generally in order to test in a conventional research study), and the one that is generated from the empirical, collected data ("grounded theory", like the one generated here) are rightful. *In this study*, there are two theoretical understandings (theoretical frameworks); the reason to this is first to investigate the grounded theory of adoption PBL by analyzing the appropriately defined and collected research data (theoretical understanding grounded in the opinions of the aerospace and defense systems logistics authorities/experts) and at second step developing it from the literature, then they will be compared to each other for similarities or dissimilarities to evaluate the empirical study so that comparing them for the triangulation could be possible.

When Glaser & Straus (1967) discovered GT, it was based on positivist epistemology, Strauss & Corbin (1990, 1996) then made impression on positivist processes, and then Charmaz (2000, 2006) brought new horizons to GT by constructivist approach; first of all, while Glaser & Straus proposing four phased coding, Strauss & Corbin proposed three phased (open-axial-selective), and the last, Charmaz do not use it but proposes only two phases of (initial and focused) coding.

Grounded Theory, general process description: The understanding the process is important in GT, in this context Muller's (2014, Fig. 2) depiction is quite explanatory, which is shown in Figure 1.9 below; the work starts (at the bottom of the figure) with coding of the data, then these codes are configured into categories; the number of the codes, or categories all depend on the data, the process continues till a saturation is reached in theoretical samplings.

Theoretical sampling is the key of GT; where the last category represent the sound theory; it can be named as potential theory, that is expected to turn into a theory. Memos are description of these theoretical sampling written by the researcher. And the comparison is done among the codes/categories; the concepts grounded in those codes and categories; constant comparisons of data against to the informal hypotheses (potential theories).

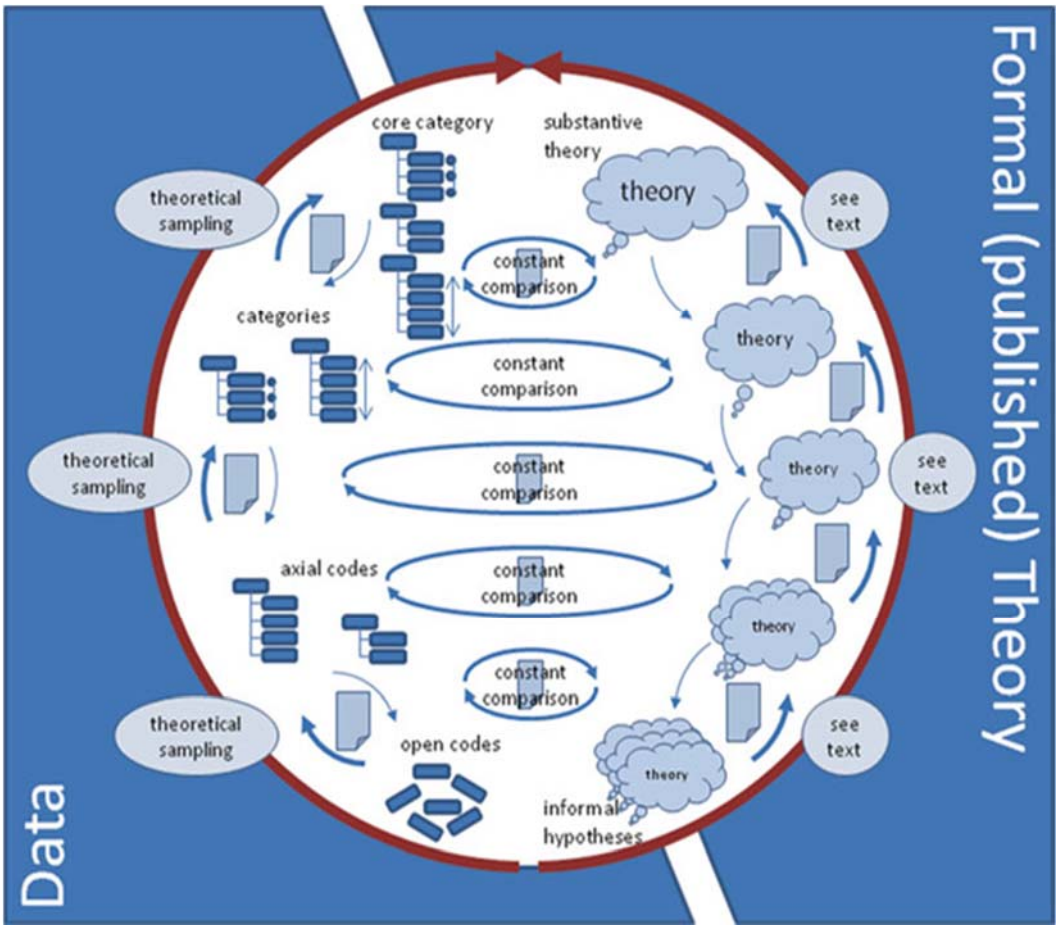

Figure 1.9: The GT process block diagram (source Muller, 2014, Fig. 2).

The codes are assigned to data, then a relation with existing codes are sought and it is replaced under a category. Sometimes, it may not go under any of the existing categories, then maybe a new category emerges, or new data is needed if any theoretical output is imaginable, it is tried to be constructed through the codes that represent concepts, and core concepts represented by the core categories in the figure. The new data is coded openly, compared to existing codes and categories (in fact the concept of the new code is constantly compared to the theories represented in this study with categories (that eventually may take a graphics representing a tree diagram, that can help to describe and depict the theory or theoretical sampling) in tree diagrams.

And data collections, coding, comparisons to reach new hypothetical theories continue in an iterative progress till reaching a saturation in all theoretical samplings that eventually represent the GT.

1.5.2 Ways and Sub Techniques

Charmaz (2006:2-3) defines the grounded theory methods as systematic guidelines for collecting and analyzing qualitative data to construct theories, indeed finding out the theory ‘grounded’ in the data themselves. The Charmaz's approach is elaborated below.

The data makes the basis of theory, the analysis of that data generate the concepts. The researcher, with other saying now, the Grounded theorist tries to gather data from the beginning of the project. The researcher, tries to learn and understand the what is happening, and what the research participant experiences. The researcher tries to bring the explanation to the statements of the research participants, and value the analyses.

The researcher needs to be open to what is happening in the studied situations and interview statements so that to learn the maximum. The Grounded theorist start with data, try to construct those data; she/he uses and utilizes his/her observations, interactions, or materials that s/he gathered about the research topic or setting. The researcher, tries to study all the empirical experiences or events and maintain her/his intuitions and potential analytical opinions about them. The researcher may use relevant qualitative methods to follow up the interesting data.

The data starting from the earliest opportunity is collected and especially the early data is labeled (coded). That way, data is decomposed, and then sorted for preparing to comparison with other parts of data. The analysis of data that way, by comparison of the importantly marked codes, writing memos the ideas are defined to make tentative categorizations. When unavoidable questions arise and gaps in categorizations come in sight, the answer to that question and the data filling the gap is investigated, which are the build stones of the theory that was aimed.

Two Types of GTM: Charmaz (2006:129-131) says theorizing, lets you reach down to fundamentals, up to abstractions, and probe into experience. She mentions two types of grounded theory, objectivist, and constructivist.

Objectivist, and constructivist approaches: According to Charmaz, “constructivist approach” places priority on the phenomena of the study and sees both data and analysis as created from shared experiences and relationships with participants and other sources of data. According to Charmaz (2013:402) only starting assumptions and research actions are affected by the objectivist or constructionist

models, "In practice, however, grounded theory inquiry ranges between objectivist and constructionist approaches and has elements of both. Objectivist grounded theory strategies encourage researchers to be active analyst of their data. The reflexivity and relativity in this constructionist approach fosters taking researchers several steps further through critically examining their construction of the research process as they seek to analyze how their research participants construct their lives.".

Constructivist Approach: In the application to the Performance Based Logistics, this "constructivist grounded theory approach" looks more appropriate than objectivist, where "Objectivist grounded theory resides in the positivist tradition and thus attends to data as real in and of themselves and does not attend to the processes of their production."

In constructivist approach, the theory is not, and cannot be independent from the researcher's view, while different researchers may end up with similar ideas from the same data although their interpretations are different. According to Charmaz (2006:130-131), this can be explained by learning how, why and to what extent the studied experience is related with positions, networks, and situations and differences at hierarchies of power, communications, and opportunities. Hence, constructivist approach requires being in caution to conditions maintaining or changing these indicator variables.

Objectivist approach relies on the truthiness of the data's representation of the situation, but since the data source is human, and since human cannot be independent from sensational effects.

Since the researcher has witnessed this situation in interviews and testified it, the researcher use not objectivist but constructivist approach of GTM application in this study.

Bryant & Charmaz (2007:607) describe constructivism as "... a social scientific perspective that addresses how relatives are made. This perspective assumes that people, including researchers, construct the realities in which they participate. Constructivist inquiry starts with the experience and asks how members construct it. To the best ability, constructivists enter the phenomenon, gain multiple views of it, and locate it in its web of connections and constraints. Constructivists acknowledge that their interpretation of the studied phenomenon is itself a construction."

CHAPTER 2

METHODOLOGY

Charmaz (2011:361) states about the GT; “Grounded theory” refers to “a method and its product, a theory developed from successive conceptual analysis of data”. The data may be collected by several methods such as interviews or documents, while researchers may face difficulties in adopting grounded theory strategies. Charmaz states (2011:361) that “Grounded theory strategies can help scholars with diverse pursuits without necessarily developing a grounded theory.” The theory does not have to be perfect, finished, or verified; however, even if a researcher is not successful in developing a ‘theory’ (an explanation of the problem), s/he may be satisfied with what is reached through those tough endeavors. Hence GT strategies can be used with interviews or documents to develop a theory or understand a problem, that is the perfect fit to this study

The methodology of the study is covered in this chapter, it starts with the Epistemological considerations in research.

2.1 Overall Design of the Study

A general research design covers all the steps of a research study; starts with deciding on the research question through theoretical orientation (literature review) on the problem area, then deciding on the data, respondents and collection method(s), analysis method(s) of collected data, and as last step the reporting of the study including findings, results, and conclusions, the difference between the quantitative and qualitative methodologies differ on all these steps (Marvasti, 2004:9). The design followed qualitative design. Creswell (2009:173-201) explains in a guideline, all aspects of procedures of a qualitative study and used as a reference throughout this study.

Validity of a study starts from the study design, follows by rigorous application of the design, and meticulous evaluations and discussions. Creswell (2009:176) (recalling Creswell & Brown, 1992) depicts a “Holistic Account” as the researcher’s endeavor to describe the complicated picture of the research issue, from defining all the relevant factors, to reporting all multiple viewpoints to visualize the integrity in one big picture.

Bowen (2005) summarizes a guidance for the qualitative researchers including doctoral students, that provides a quick guidance on the issues such as what needs to be cared in which section etc., that work is utilized as a quick reference to check this study during and after preparation.

2.2 Epistemological Considerations in Qualitative Researches

Creswell (2009:3-20) emphasizes the philosophical assumptions of the researchers in their work; in addition to classifying a study as quantitative, qualitative, or mixed types, besides the "researcher's own personal training and experiences" (2009:19). Creswell suggests the researchers to state clearly their philosophical Worldviews (2009:3, 11), and (2014:1, 9). Hart has called it as "major intellectual traditions" that shaping the view of the nature of the world and therefore developing knowledge and understanding of the world around the researcher (1998:22); "Knowledge of historical ideas and theories, or philosophy and social theory, is essential.".

A research approach (whether quantitative, qualitative, or mixed) is an interconnection of the researcher's philosophical worldview (either post positivist, constructivist, transformative, or pragmatic), research methods (related with either questions, data collection, data analysis, interpretation, or validation requirements of the research) and research design (related either quantitative, qualitative, or mixed methods chosen/required) (Creswell 2009:5-6). Since the researcher's philosophical ideas affect her/his choice on research approach methods, four worldviews described by Creswell (2009:6) is presented in Table 2.1, and its effect on the design of the research is shown in the Figure 2.1 (both are on the following page).

Table 2.1: Four world views (Creswell, 2009:6).

Post positivism	Constructivism
1) Determination 2) Reductionism 3) Empirical observation 4) Theory verification	1) Understanding 2) Multiple participant meanings 3) Social and historical construction 4) Theory generation
Advocacy/Participatory	Pragmatism
1) Political 2) Empowerment Issue oriented 3) Collaborative 4) Change oriented	1) Consequences of actions 2) Problem centered 3) Pluralistic 4) Real-world practice oriented

The effects in this context are noted by the researcher within the whole study and reported in proper sections of this report (such as research design, researcher's role, as well as the results evaluation and conclusion sections).

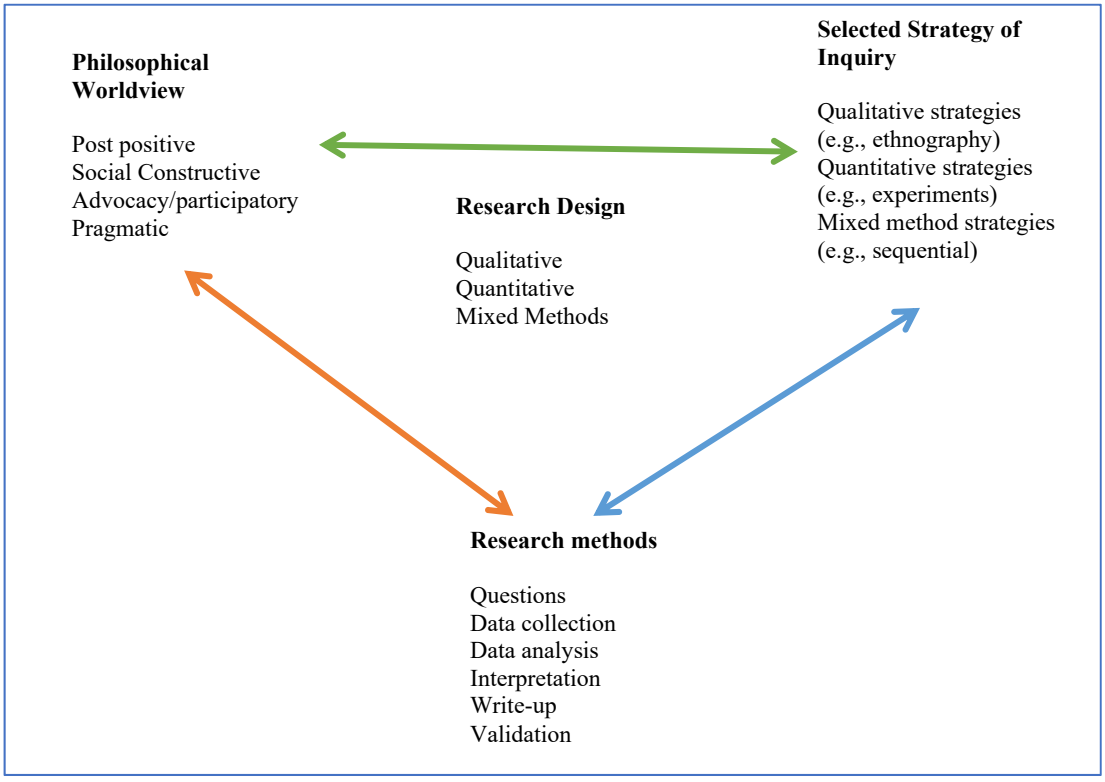

Figure 2.1: A framework of design-The interconnection of worldviews, strategies of inquiry, and research methods.

Before stating the philosophical world view as Creswell emphasizes (2009, pp-3-20), the researcher needs to notify that, at the beginning he preferred to do a mixed research study, however due to the limitations/un availability of adequate data and or data sources (either as case study, or as interviewees), he adopted the qualitative "research design", selected qualitative "strategy of inquiry", hence the "research methods" (the questions, data collection methods, data analysis, interpretations, write up, and validation) is expected to be aligned with the "worldview" or the worldview needed to take the measures for offsetting the interviewer bias. That statement was done to give an evidence of the situation that a choice without limitation would reveal the worldview more precisely, however that delimitation blurred the situation and now the researcher has a claim; in the absence of that choice, the choosing the mixed method was not achieved. In this context, the researcher honestly declares that he has all (4/4) features of constructivism and pragmatism, the post positivism and advocacy features both are 2/4 (1st and 3rd in the former, and 3rd and 4th in the later).At that stage the researcher considered the research topic, the interviewees, and his background; and he decided to constructivist approach (instead of Glaser's objectivist approach) be more proper for this study (especially with existing delimitations on data availability).

In that explained context, the researcher recognizes his own background that well trained, knowledgeable, and experienced in the logistics field (a shaping factor of interpreting the implicit meanings of participants which make sense on historical and social perspectives while trying to inductively develop a theory of meanings from the data collected from the field).

The researcher, puts an extreme care on doing this study to behave objectively by designing the interview protocol, collecting and analyzing the data, interpreting the meanings in coding/categorizing/theorizing the theoretical understanding; these all are towards increasing the reliability and validity (trustworthiness) of the study, and are explained in proper sections. Additionally, the status of the researcher also is a factor on her/his role and behavior, in that respect, it does not present any negative effect in that context if it is worth to declare.

Additionally, in this study, since the researcher seeks the views of the (representatives) of the stakeholders of PBL in Turkey; to consider the effect of their worldviews, and paradigms on their expressions the research design is made

accordingly, the open-ended questions are preferred in both stages of the interviews so that the participants can express their own meaning on the situation.

2.3 Research Design

Charmaz (2006); Corbin & Strauss (2007) describes the Grounded theory as “a design of inquiry from sociology in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants. This process involves using multiple stages of data collection and the refinement and interrelationship of categories of information” (as quoted in Creswell, 2014:43).

The principal difference between the two main approaches of GTM as objectivist and constructivist are explicated in section 1.5.2. in detail; and the rationale of choosing the constructivist approach for this study is also explained in the same section, as Charmaz articulates (2006:132); here the researcher aims "to show the complexities of particular worlds, views, and actions.", which is an exact fit to this study, where the stakeholders all have their own particular opinions on the same PBL reality. If an objectivist approach were decided, the study purpose would not be reached, because of the biased, partial, prejudiced, subjective (unobjective) opinions, or with other saying, it would not be possible to align so many intricate opinions in one objective line or select 'the (most?) objective one'. Because the objectivity of the opinions cannot be guaranteed, even if that can be guaranteed, the objectivity of "a" researcher also cannot be guaranteed either. As last, Charmaz (2006:131) states that "An objectivist grounded theorist assumes that data represent objective facts about a knowable world."; that assumption cannot be done by the researcher.

Hence, the constructivist GTM approach of Charmaz (2006) is appropriate research methodology for this study, where to emerge a theory (an explanation) is aimed to adopt PBL; that is unavailable, PBL adoption does not have a theoretical understanding or explanatory framework.

A PBL adoption framework can be derived by utilizing GTM on collecting and analyzing the proper interview data. GT, has been used in PBL field by several researchers already, some important cases are listed below.

One of the users of constructive GT in PBL is Randal et al. (2010) to build the theoretical framework behind the PBL using the opinions of the service dominant

logistics; although 61 interviews has been done only 41 is transcribed and used in that study.

The other important GTM user (constructive approach) Randall et al. (2015) use 17 sets of interview data, besides engineering literature to explore the factors effecting the success in usage of innovation in PBL; one of the tenets. He reaches eight categories and associated propositions that have implications on both practice and theory.

Quick (2011) has used GT to reveal the critical qualifications for successful PBL execution through nine experts' interview data and three PBL contract as case study. Cebeci (2009) has also utilized GTM together with case study, aiming to reveal the cultural effects on PBL in non-western countries.

The last point in research design was to design the reliability and validity into the study, that was kept in mind during all the stages of this study.

2.4 Research Question and Research Context

Charmaz (2006) states that in grounded theory studies it is difficult to determine the research questions in a sharp way at the earliest phases of the study. In that context the text of research question has been changed several times. Starting from the earliest versions the research question(s) took several shapes and expressed in several texts forms, such as: The earliest form was: What is the gap in PBL applications, that I can do my research? There was no intention to use qualitative research methods, but quantitative, or at least case studies.

Then when noticing the controversies in the first unstructured interviews, and convinced that there would not be enough data for case studies; the research question became: What is going on in PBL adaptation initiative? Why is this disunion? Then became: What is the beneficial way of adapting the PBL? Beneficial to the country, beneficial to the stakeholders especially the user, and the defence industry; to provide the security and welfare to the citizens. Apart from the universal literature, the empirical data was the most important in that context; on the other hand, any study in this respect was not came across. And, the grounded theory was selected as the method of the study, during the first unstructured interviews. The interviews were ceased, and GT was studied in detail. And again, the interviews (of the first phase) were resumed. The interview data were aimed to be used in grounded theory. The interview guide

was designed after the first (initial) phase of the interviews; and the goal of the interview was planned as "... beneficial application theory of PBL in Turkey, especially if the data are evaluated in the grounded theory methodology." research question then was: What are the key points of beneficially usable PBL strategy? that can be reached in a study that may help to resolve the issues and to create the synergy that is necessary for PBL. This was derived from the initial literature review done in "limited" manner according to the requirements of GT. However, this question was not a GT research question that the answer can be gathered through the analysis from interview data, and it is modified accordingly.

Basic research question (RQ): How does the logistics system responses to this new PBL strategy? To answer this main question; the following sub questions are needed to be answered:

RQ_1: What are the implicit key points of PBL's application in the maintenance of aerospace and defence systems from the view points of the representatives of stakeholders in Turkey? (In short form; What are the implicit key points (concepts/processes) of PBL application?)

RQ_2: How do the implicit key points (their theoretical explanations) fit into the practices in USA, where the PBL strategy is emerged?

In a qualitative study research question takes place of objectives or hypotheses as in quantitative studies, and it is in two forms; central and sub question (Creswell, 2009:129-132; 2014). The form of central question for grounded theory study is described as:

"(How or what?) is the _____ (“theory that explains the process”) of _____ (central phenomenon) for _____ (participants) at _____ (research site)." (2009:131).

In that respect the central research question form of RQ_1 is written by "what" question word:

Question's parts here disclose the research context; as several important features of the research such as; “theory that explains the process of” grounded theory is 'the implicit key points of PBL's application', "central phenomenon" of the research is 'in the maintenance of aerospace and defence systems', "participants" of the research are 'the representatives of stakeholders', and the "research site " is 'in Turkey'.

Using the form stated by Creswell (2009, 2014) helps the research question to disclose some more important features of the study also like; the strategy of inquiry is seen from the question type as GTM, the question word "how/what" is expressing that the research design is an open/emerging type, the main phenomenon (or the single focus) is 'in the maintenance of aerospace and defence systems', 'What are the implicit key points' expression implies a discovery; i.e., GTM, additionally there is no reference to any literature or theory in the question (which also denotes a GTM question), participants are defined in the question sentence.

It needs to be noted here that, the answer to RQ_1 can only be answered by an empirical research study, it will be answered by doing so, on the other hand, however, the answer to the RQ_2 cannot be answered through any empirical research but through a detailed literature review; it will be answered after making the focused literature review. However, additionally, since an early detailed literature review is criticized in GTM (Charmaz, 2006:16; Randall et al., 2015:36), the initial literature review is kept general, and a sharply focused literature review is carried out and added following the empirical research.

2.5 Data Sources

The prime data source in this study is interview (Iv). Creswell (2009:175) suggest using "multiple sources of data "instead of relying on a single data source. In this study, among the suggested sources, the observations were not applicable, hence the rest two; interviews and documents were utilized; reviewed, understood, and categorized in line with the research aim. Creswell (2009:181) explains the documents as qualitative public documents "(e.g., newspapers, minutes of meetings. official reports) or private documents (e.g., personal journals and diaries, letters, e-mails)". In this study documents are used extensively.

2.5.1 Participants, Invitees, Respondents

The participants in this study consist of the active or recently retired executives or experts. The interviews were hold normally in two phases. The first phase participants were selected by purposeful sampling. Having the purpose of exploring the factors of beneficial and applicable PBL, the existing logistics system

organizations were the source of the interviewees. Some of the interviewees were chosen from recently retired people of these organizations. On the other hand, having the new PBL initiative, some of the interviewees were carefully selected from these organizations. The logistics organizations as stakeholders are also taken into consideration on this selection process to provide necessary representation of these entities. The first phase of the interviewees was also tried to be chosen from active or recently retired personnel, or experts who are occupied higher level of positions.

The second phase interviewees on the other hand, are tried to be chosen among the high or middle level position holders, or retirees. For second phase interviews, the interviewee candidates were asked and identified during the first phase of the interviews either by appointments, or by advising in waterfall method. The candidates were from wider area, including some retirees of government who are working for private companies, for their own businesses or working as academicians in the universities.

The reactions of the invitees were various; some of them accepted to participate, some of them on the other hand accepted the invitations at the beginning but later showed a justification; a negative answer or an attitude either by a not answering the calls or e-mails at all. A few of them are convinced by reputable mediator(s). This was seen unavoidable choice, as the number of competent people in defence logistics is few, besides they were busy people.

The variation in the beginning was taken broad in number as well as in the sectors, such as to take the opinions of the army, navy, and General Directorate of Security systems/vehicles in addition to the relevant academicians and Air Force/ aerospace, but later delimitation was brought, otherwise the study would not be completed. The total number of invitees that a contact tried to be established however either they are treated like this (from other sectors) or (although they are from aerospace sector but) they did not return any responses at all are 14 persons.

The total number of responses was 68. Later, they were pre-interviewed either by telephone or e-mail and kept as additional sources of data in the case if required to reach saturation in theoretical sampling. However, the theoretical sampling has reached saturation after 26 persons; in practice the interviewing so does the coding has continued until 33rd person's data sets to reach enough density in the categories at least, however after 7 more persons were included in the interviews and fully evaluated

for new variations among concepts. Theoretical sampling in grounded theory is a qualitative sampling method, the researcher searches for the people, event or information/knowledge in order to make clear distinction between the boundaries of the categories; the fundamental purpose is to develop a theoretical category in the way of building a theory that is actually grounded in the data (Charmaz, 2006:189), theoretical sampling continues till widening the route (saturation). The Figure 2.2 shows the invitees position on the MaxQDA software tool. The MaxQDA is a versatile tool even for making comparisons among the participants. Excel could be used, and tried to be used, however, in a big list of tables, it might be confusing, therefore MaxQDA is chosen for this study, and it is utilized even in the invitees/participants' analyses[11].

On the top raw, the stakeholders (User, Organics, Private, Foreign, Institutions, and the government (here it is called moderator) is seen. The "2 specials" is the code for the retired military people who is now working in another job and especially involving military logistics.

At the end the list became "33 invitees", and "35 justifications", the details can be seen from the figure (the "unanswered", or "disqualified at the beginning" are not counted here.

[11] This graphic is taken from MaxQDA tool (GÖRSEL ARAÇLAR-Kod Matris Tarayıcısı + Belge setleri, sadece etkinleştirilmiş belgeler için, Sadece etkinleştirilmiş kodlar için+Background of Interviewees- Instead of Interviewees' properties (demographics) Kod-Alt kod-Bölümler Modeli).

Figure 2.2: The respondent invitees in coding system (MaxQDA tool output).

All the efforts on reaching to the correct person to get his/her opinion relevant to the research question has ended or pushed to end either with one of the following;

An Affirmative response including a set of opinions for (33);

1) Interview I at initial phase (10)
2) Interview I at supplementary phase -(by providing 'new' data) (6)
3) Interview II (19)

On the other hand, a Justification (denotation) from (35);

1) assistance in networking and in discussions/critical thinking/evaluations (like an area advisor) (10)
2) appointment someone else (3)
3) chitchat (7)
4) rejection in one of the following forms below (12);
    a) notification (2)
    b) not answering (1)
    c) procrastination (9)
        a. image of refrainment (7)
        b. image of curiosity (to see the interview guide, and learn 'what is going on there?') (2)

The distribution of the 68 people to stakeholders, and their categorized responses are seen in Figure 2.3 below[12].

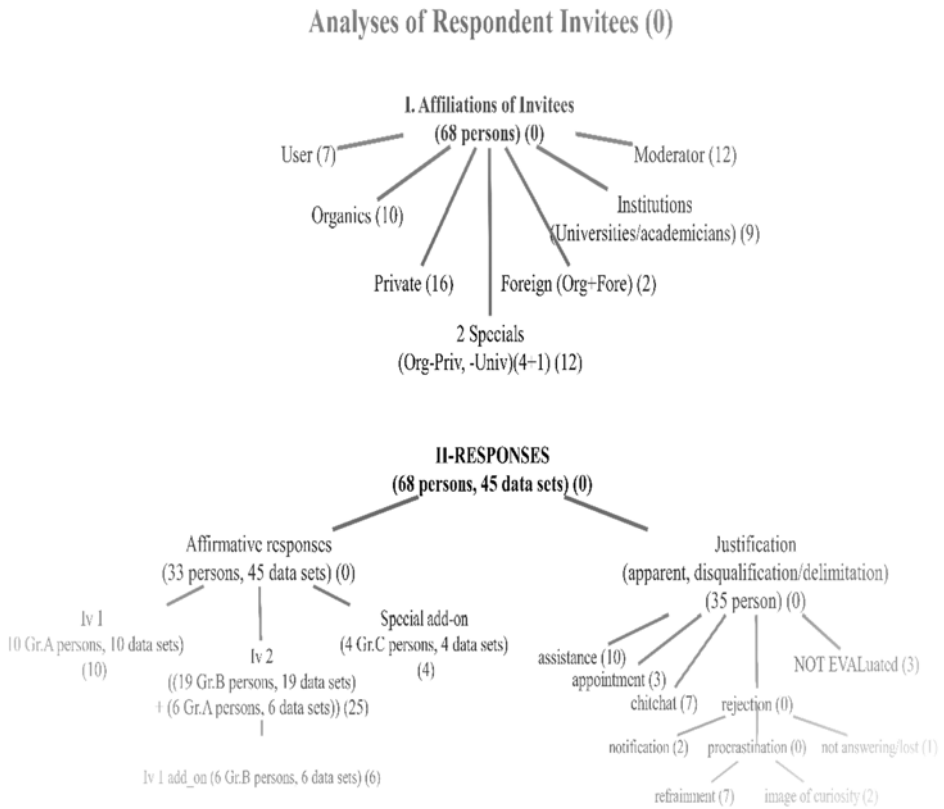

Figure 2.3: The properties of the invitees and distribution of the participants to interviewees.

[12] This graphic is taken from MaxQDA tool (GÖRSEL ARAÇLAR-MAXMaps- ++Background of Interviewees- Instead of Interviewees' properties (demographics) Kod-Alt kod-Bölümler Modeli).

The numbers of the belongings of the invitees are stated in the figure, it should be noted that "2-specialties" are retired people having their second jobs.For clearness the numbers are depicted in Table 2.2 below.

Table 2.2: Distribution of Participants to Interviews and data sets.

		Group A	Group B	Group C	*Total (persons)*
Persons		10	19	4	33
Data Sets	Iv 1	10	6	4	20
	Iv 2	6	19	-	25
Total (Data Sets)		16	25	4	45

The total number of the initial interviewees is 10, 6 of them has participated to supplementary interview together with an additional 19 new persons; another additional 4 new persons "Iv 1 add_on" are invited and participated in the supplementary interviews ("Iv 1" is the code of " Interview 1"; that is "initial interview" or "first stage of the interviews").

The group A, B, and C denotes the three groups occurred in the interviews; at the beginning, after and the last respectively. Iv 1, and Iv 2 participants and output data sets distribution to these groups are seen in Table 2.2 above.

2.5.2 Analyses of Interviewees

The properties of interviewees are important for the research purpose; their merits are categorized under knowledge and experience on PBL and defence logistics which are coded according to their statement which are noted on the following figure (Figure 2.4).

All the efforts on reaching to the correct person in order to get her/his opinion relevant to the research question has ended or pushed to end either with one of the following;

Useable response including a set of opinions for;

a) Interview I (at initial phase)
b) Interview I (at secondary phase)
c) Interview II

No useable response, and a denotation of;

a) assistance in networking and in discussions/critical thinking/evaluations (like an area advisor)
b) appointment someone else
c) chitchat
d) rejection in one of the following forms below;
    a. notification
    b. not answering
    c. procrastination
        1) image of refrainment
        2) image of curiosity (see the guide, and learning what's going on)
e) Not evaluated

The properties of all the interviewees are seen in the Figure 2.4 below.

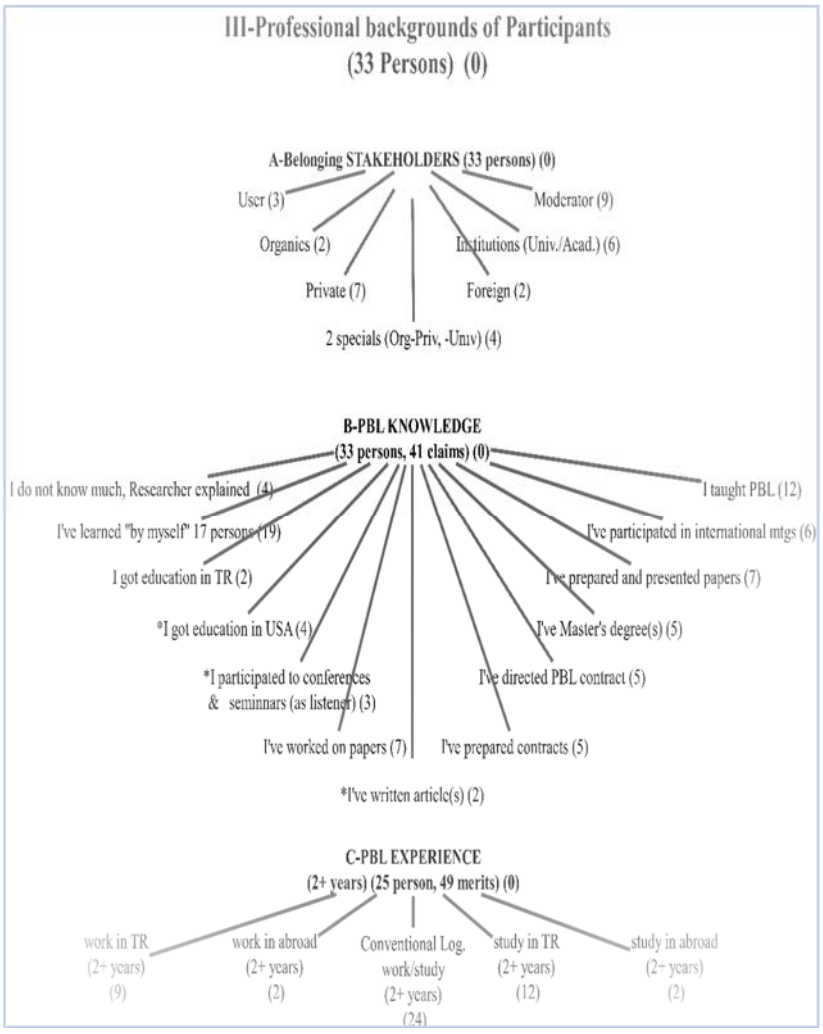

Figure 2.4: The backgrounds, knowledge, and experiences of the 33 interviewees.

The professional backgrounds of the 33 participants to the stakeholders are seen in the Figure 2.4; the four of the interviewees are retirees (their places are hidden by the author for anonymity). The PBL/military logistics knowledge and experience are also noted in the same figure[13].

2.5.3 Knowledge and Experience Levels of The Participants

Four of the interviewees have known nothing (with their expressions) about PBL, but all the participants have knowledge and experience on defence logistics. Three of them have a MS degree in PBL (one has two MS degrees); The participants with MS degrees are belonging to User, Moderator, and Foreign stakeholders.

Participants have declared that they have responsibilities in PBL projects. Considering the backgrounds of the participants as their jobs and experiences it is seen that they all are competent on the military logistics; the 21 participants have 15-30^{+} years' experience, 7 of them have 4-15 years' experience. Among the interviewees, three military-based, and one civilian based participants have doctorate degrees, and one is a doctoral student.

Most of the participants including invitees (some of whom are coded by "assistance", "appointment", and "chit-chat") are/were all high-level executives (three of them are/were high capacity technicians). These were kept as standby in the case if some more interviewees are needed for theoretical sampling saturation.

Experiences of the respondents are categorized under two main headlines; The conventional logistics experiences, and PBL experiences, since first it is difficult to find PBL experienced people in Turkey, which is normal as PBL is being adapted already. Those PBL experiences are counted in two categories as "in Turkey" and "in abroad", which are again divided as "work" or "study". The criteria to code any activity to be counted in this code is simple; the experiences in field (at least 2 years) as study or work are counted.

Conventional logistics is the most common specialty seen in the 24 of the respondents, which makes the backbone of the logistics experiences, all the main stakeholders as well as the institutions and other group of people ("2 specialties" is named after the respondents that are generally retired from organic facilities, or higher

[13] This graphic is taken from MaxQDA tool (GÖRSEL ARAÇLAR-MAXMaps- ++Background of Interviewees- Instead of Interviewees' properties (demographics) Kod-Alt kod-Bölümler Modeli).

echelons of them) generally owning or working for the private sector, or as academicians in universities or as advisors.

It is rare to find experts in Turkey about PBL, however there are more experts in conventional military logistics in both military and civilian sectors.

The approach to evaluate a respondent's opinion, the experience in conventional logistics might reflect a rigorous value in the opinion in comparison of the experiences; the experience in conventional logistics might help to understand the PBL concept and application models/approaches.

From this point of view, the experiences in conventional logistics are counted in coding. The worth of this merit is not weighted however and left to be an item in analyses.

The rarest found type of experts in PBL comes out to be the experience either as work or study in abroad; there are two such experts among the respondents; one each in User, and in Organics[14].

Representativeness of the participants were important since they were purposefully chosen for Representativeness and experience and knowledges. They were checked in the analysis for competency as well as the adequacy in any of the stakeholders.

2.6 Data

Charmaz says “Note that, when dealing with grounded theory, you don’t have to concern about accuracy” (Charmaz, 2013, t. 28:55). The quantitative research is a rigid, should be planned very carefully and tested at the very beginning. The Quantitative research, on the other hand, is just opposite of Qualitative research, where the aim is to collect the suitable and sufficient data. The rest is details. i.e., the researcher can play with everything. Hence, the researcher and data are up most important in the grounded theory.

Choosing Data: The researcher in a qualitative research has to be very careful choosing the data (whether the required data is qualitative or quantitative) since both the Quality and credibility of the study depends on the usefulness, suitability and

[14] Some of the personnel's knowledge and experience data could not be gathered due to several factors; while some data are modified or not coded at all to protect the anonymity of the participants according to their will expressed at the beginning of the interview.

sufficiency of the data; a rich, substantial and relevant data makes the study "stand out" (Charmaz, 2006:18). The grounded theory needs much more data than the traditional research methods, because the researcher does not know what s/he ends up at the end of the study. The data sorting and analysis is much more time consuming, Data is not structured as in quantitative research, hence the researcher needs to be very skilled.

2.6.1 Data Collection Process

Data collection method (as a process) and its details (procedures) in literature; Charmaz (2006:10) notes that, although Glaser and Strauss talk about the theory that is separate from the researcher in 1967, she argues the researcher is also part of the world of study as well as the data collected, therefore the theories constructed cannot be separate; hence the researcher construct theory through the past and present involvements and interactions with people, perspectives and practices special and personal to her/him. This means, the product in the Grounded theory, is up most dependent on the researcher.

Glaser (2002:24-25) declares GTM as a general method that can be used with qualitative, or quantitative data gathered with any of the data collection methods.

The qualitative researchers by using the grounded theory methods are more advantageous than their quantitative counterparts. Because, they can adjust their study just according to the moment's needs, even they can repeat the data collection with new questions. Therefore, the question formulation is not a matter; "With grounded theory methods, you shape and reshape your data collection and, therefore, refine your collected data." (Charmaz, 2006:15). Charmaz points out that, the grounded theory, is not rigid, is flexible guideline, therefore a researcher with insight and industry, it offers sharp tools for theorizing, mining, and making sense of data.

Neuman (2006:425) says that in grounded theory, the theory takes its shape during the data collection process. The process is described as developing and modifying the concepts and theory through an interaction of theory building with data collection that is examining the data without any fixed hypotheses.

Neuman (2006:157-158) describes the grounded theory as developing the theory by the researcher during the data collection process. It is a theory building method by using the collected data or codes grounded in that data. The grounded theory is a

method used by the researchers who want to be flexible, open to the unexpected, changes in the ways of a research may go or reach.

Therefore, the data collection process in this study is executed through carefully planned procedures; to obtain the right data in an unstructured face to face interviews for the initial stage, and after shaping the extra data needs in terms of sub-topics and context in accordance with the GTM analysis of the initial interview data, then the secondary interviews were planned again in face to face interviews. In both stage 1 and 2 interviews, the upmost dedication was payed to obtain true thoughts of the interviewees with a wide angle look to the matter, letting the interviewee consider and express all her/his viable alternative thoughts about the topic.

Reducing interviewer bias; (Neuman, 2014:217) states that, face-to-face interviews permit longest pre-questionnaire, and have the highest response rates, but on the other hand interviewer bias is greatest. Interviewer bias can be reduced by using fixed-wording questions (Scott & Marshall.2009:372). The researcher has shown outmost care to the interviewer bias in the design, data collection, and during data analysis, besides researcher has explained his evolution in academia in following 'The role of the Researcher in Qualitative Inquiry' section.

In this study, the interviewees were chosen from authorities and experts representing all the key stakeholders, the questions were designed carefully, and in the analysis stage, the codings were consulted with an expert to increase the internal validity. The interviewees were purposefully selected from the key stakeholders, they were either an authority (a decision maker) or an expert (assisting on decisions) of their stakeholder; they were all authorized, knowledgeable and skilled with competent experience in military logistics, their experiences on PBL was the highest available in the country. Initial interview was planned as unstructured, intending to obtain the views and opinions of the participants with open ended questions, while the supplementary interview was planned as semistructured to include the questions about the topics revealed at the end of the initial interview.

The interviews were held in two stages; in the initial interview even there was not a question at the beginning, then after the third interview a question was formed, and later it took its last shape in two questions as; "*What do you think about the PBL applications? How do you see its applicability; can you describe the key issues?*" The aim was to understand the PBL's application/applicability issues from the interviewee's

point of view. Then, the questions in the supplementary interviews were about opening the details of the topics that were revealed in the initial interviews; all the questions were about asking the experts/authorities about their opinions on those topics, their explanations about the topics. More than that, the supplementary interview participants were also invited to add and express their own opinions on the main question of the initial interview again: "*What do you think about the PBL applications? How do you see its applicability; can you describe the key issues***?**" In the supplementary interviews, six participants out of the 19 new participants had expressed their own opinions on these main questions, that were an indication of the absence of the "interviewer bias". On the other hand, some measures could not be applied, such as using other/additional interviewer(s) in data collection or having two more coders and compare the results in codings. Although the number of the interviews were adequate in reaching the theoretical saturation for the aerospace and defense sector, the interaction/relations of aerospace and other (army/navy) sectors from PBL aspect was still hidden, therefore the delimitation of the study to only aerospace field hampered the generalizations of the findings.

Interviewee bias: In literature among the features of the researcher Strauss and Corbin (1998:7) mentions about the sensitivity to talks and actions and noticing the tendency toward bias in the speaker. The researcher did not come across any discussion in literature about the interviewee bias within this study limitations, however, the researcher thinks about an interviewee bias in terms of the explicit or implicit traces in their expressions reflecting their inclinations or aversions on the topics. In this study, in addition to considering epistemological effects on the research design, during the data analysis and interpretations from the expressions of the interviewees were carried out carefully noting their worldviews, as well as their paradigms that are the results of their trainings and experiences, it helped in understanding of their opinions when and if their worldviews are estimated; it helped to analyze the opinions especially in coding-categorizing and developing the hypothetical propositions (theoretical samplings).

2.6.2 Data Collection Procedures

Interview Protocols: Creswell (2009:183) describes the protocol for the place, instructions to be followed by the researcher (interviewer), questions (an icebreaker/

introductory/ probe/ main/asking details questions, pauses to take note/s), and a thank you statement at the end; it is followed in designing and executing the interviews.

The protocol designed: The data for this research study was based on the information gathered from the purposefully selected participants through one to one interviews. The aim was to understand their responses to PBL applications and their considerations about PBL implementation. The interview questions were designed to investigate a participant's opinions on PBL applications and implementation issues, however the questions structure and presentation to the participants should not manipulate their answers in any way (no criticism to their understanding/opinions, nor any discussion/implication/insertion of the researcher's own understanding/opinions); the interviewer (the researcher in this case) shall use a neutral code of conduct in this position. The opening, progressing, and closing the interview shall be conducted as Creswell (2009:183). The scheduling and duration of an interview shall be informed and coordinated by the participant in advance, and their choice of taking notes and records about the minutes, their attitude on anonymity shall be taken through an informed consent form after they are notified on the use/security of their expressions in this study, and their rights to withdraw at any moment during the process, their attitude/wish to check the noted version of their expressions (they were given a right to write down their own expressions). These issues are all designed into the invitation letter and its attachments (See Appendices B and C (Turkish Version)).

The initial interviews (Iv I) were carried out without using any predetermined guidelines, no questions at all, with only one topic: The PBL and its applicability in aerospace and defence logistics; that is in unstructured way, in face to face meetings, one to one with the interviewee, using pen and paper only to take notes; not to use any recorder, and a protocol in mind; not to pretend/discuss any notion that is owned by himself, but just obtaining the participant's opinion, in a very neutral/objective position. The second stage of the interviews were carried out according to the protocol of the initial interviews, but then an invitation letter to invite and inform the interviewee candidate, informing about the information security, her/his rights to withdraw from the participation at any time, informing about the need of his/her consent on this participation, and the need of a telephone coordinating the interview date and time, additionally they were given an opportunity to response in advance to decrease the time of the interview if s/he wishes, furthermore the interview questions;

The invitation letter with described attachments are presented in Appendices B and C (Turkish Version).

Selection of the interviewees: Creswell (2009:178) defines Purposeful selection as selection of the participants that will support the researcher in understanding the research problem and question. Creswell adds by citing Miles and Huberman (1994), that the purposeful selection includes the selection of the place of the research, selection of the interviewees, their occupation, and role in the main topic of the research; those all are needed to be purposefully chosen, and Patton (2002:240) supports by stating "to capture major variations rather than to identify a common core" and notes that the common core will emerge from the analysis.

The selection of both the participants and the stakeholders are seen important in this context, hence the people who are occupying the decision maker offices in all the stakeholders of PBL are targeted and searched. The researcher's background helped on this issue after an initial literature review; to define the stakeholders and related bureaus. The delimitation of the doctoral study duration, and the researcher's background settled the solution as choosing the aerospace and defence sector (not the whole military logistics). Afterward, one more effort paid to enlarging the sector to cover the other branches (such as navy, army defence systems, besides General Directorate of security) with a wider understanding and of the issue to reach a wider theoretical sampling; however, the delimitation was finalized. Later, it is noticed that, staying in "PBL" experienced authorities/experts would not provide enough number of participants since it was new strategy beside the access/availability conditions of those authorities/experts, because the studies and actual practices were limited; hence the "purposeful selection" criteria was widened to include the deep military logistics experience together with a vision/study/knowledge on PBL. That criteria were chosen as the core of the purposeful selection of the invitees, and the borders about the sector were finalized as aerospace and defence.

The key stakeholders of PBL are Government (or agency of it), the user, the service providers (military factories, defence manufacturer companies; including system manufacturers, SMEs, Foreign companies), and Institutions (universities/academia, research agencies), which are represented in this study (See Figure 2.5 on next page).

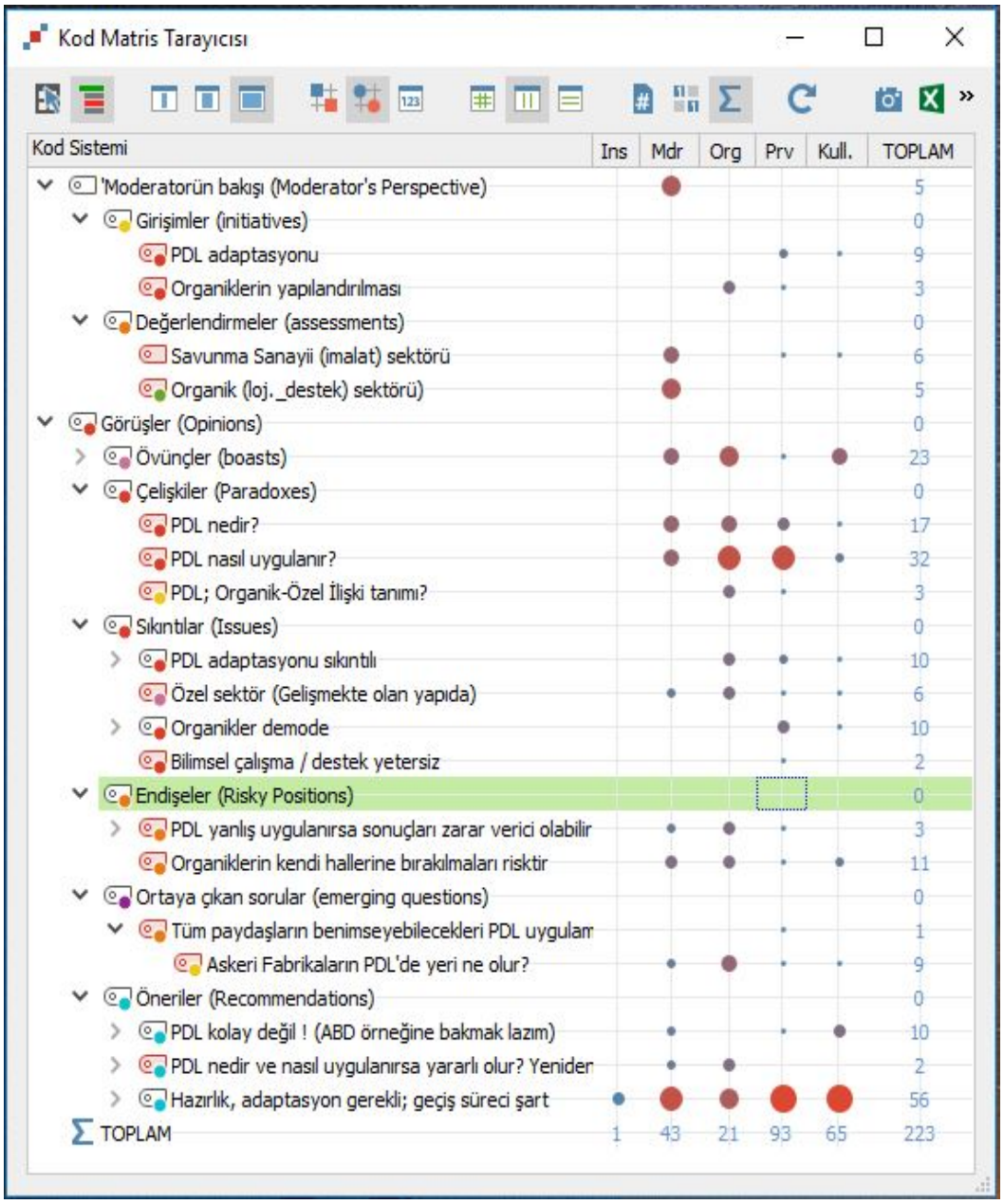

Figure 2.5: Mapping of interview data against stakeholders in GTM analysis (with MaxQDA).

Execution of the interviews, and the environment: The interview meetings were held in the interviewee's offices generally, in a few cases only, they were held in comfort public places, and in one case it was held in the interviewee's home.

The using of the recorders were generally limited to pen and paper, and in one case that the interviewee let using voice recorder, but after completing the interview s/he called and asked the researcher to erase all the data records, that was accepted exactly fulfilled, and that interviewee was noted as "*withdrawn*" (any participant in these interviews had the right to withdraw at any time, according to the protocol).

Remote participation (Remote interviews): Some of the candidates asked to participate through e-mailing; their requests were accepted if s/he concurs for necessary iterations on telephone/e-mail conversation afterward receiving their written answer to clarify and grasp their meaning in their writings. Some of the interviews were executed in that way without coming face to face meeting, but making the necessary iterations on telephone or e-mail, and some other participants preferred a meeting after their written answers; that were the most convenient form of understanding for both sides. Detailed information of these procedures is kept anonym in accordance with the 6698-numbered law about the 'Protection of the personal data' (28 b and c).

Interview through telephone: The telephone conversations were used frequently in interview period for three purposes; first, to decide to do or not to do the interview, then where and when to do the interview, and lastly to hold the interview. Some of the interviews were held through conversation on phone, in 30-90 minutes long durations, the notes were taken, later among three of those interviews only one was seen necessary to contribute to the theoretical sampling and taken into the analysis after transcription (the others were not transcribed/used).

Data Collection Process phases: The data were collected within two stages of interviews:

1. The first (initial) interviews were held at the beginning of the study, without any written protocol or guide, but just the literature review information about an interview, in the second the protocol was defined (as described in 2.6.2. Data Collection Procedures) section. Then, although no letters were sent the protocol was followed; instead of letters, either they were directly contacted through telephone, or by taking assistance from third people such as the interviewed people. Taking an appointment was requiring lengthy processes in phone or in e-mails. All the initial interviews were held at offices, these series of the interviews settled the base of the study; first series of the interviews were coded with "Iv I" in software tool, where "Iv" stands for "Interview" (Ten Iv I interviews) are this kind.

2. The second phase of interviews, that were designed and planned as it was described (as described in 2.6.2. Data Collection Procedures) section and held accordingly with designed protocol as supplementary to the initial interviews. The supplementary interviews were coded with "Iv II". Nineteen interviews were coded as

Iv II). It should be noted that, during some of these supplementary interviews, six out of 19 interviewees wanted to talk about out of the planned data topics of the agenda (i.e., the last item of the agenda), that kind of requests were accepted gladly, and those opinions were accepted and analyzed as an initial type interview and coded additionally as "Iv I). (Six interviews were coded additionally as Iv I"). Apart from these two categories there one more category; unplanned (opportunity) interviews, they came across while making another interview in the premises of a stakeholder by actual suggestions, or by an invitee's late return. Those also evaluated and utilized accordingly.

2.7 Data Analysis Process

This section follows two subsections; one for the detailed descriptions of the GT process, and second for the application in to the research.

2.7.1 The Constructivist GT Process and Its Details

In this section, the details of the GT process are described in a detailed way, that to be understood and used in this study.

About Applying GTM in general: Application of GTM: Muller (2014) explains that The grounded theory approach is a method (not a theory) to develop theory instead of testing existing theories in traditional research with an increase in the usage especially after 2000s (Muller 2014:25); and he explains that human curiosity, creativity and surprise are the real analysis tools in GTM's usage to find out the theory grounded in data (Muller 2014:25-48). In his work dated 1978, Glaser, (as cited in Goulding, 2005:297) notes that GTM can be used as a general analysis method with all data irrespective from its collection method. Charmaz claims that, theorizing is practice; a practice of constructing abstract understanding, where the grounded theory as a method provides a guide to interpretive theoretical practice (2006:128-129).

In summary, the grounded theory is a method for deriving a theory. According to Charmaz (2006:12) and (2014:17) the process in practice is not straight forward but involves several important steps; data collection- coding- memo writing- theoretical sampling, saturation- sorting- diagramming- theorizing/ first drafting of theory and writing the analysis on the entire process.

After trying to understand the matter from all the relevant resources, research is done for unknown by collecting data with open ended qualitative questions.

Categorizing the gathered data by coding, and further analyzing the data and exercising the analytic paths by comparisons in memo writing that presents opportunities for new explorations.

Then widen the theoretical sampling till categories are definitely separated (the movement back and forth between category and data in theoretical sampling nourish raising the conceptual level of existing categories and their extensions. It is possible to see the ones that can be treated as major concepts in the analysis.).

Sorting and synthesizing the categories till catching a glimpse of the theory (or a hypothesis) that is grounded in the data, an existing, professional software tool may be used in analyses of data. (Sorting and diagramming helps in initial analytic frame. Creating robust categories, through theoretical sampling, saturation, and sorting, capturing the abstract memory helps to write the first draft of the main report if you do not need to deal a little bit more with theorizing).

Once the core ideas are drafted, it is important to get the mentor's or close colleagues support by criticizing. In that context the researcher asked the assistance of his spouse, who is an expert teacher in Turkish literature, and has an experience in evaluation of education materials, has no interest in the research subject but can analyze the open and implicit meanings in the interview data, which is 99% is Turkish in language. She is taught about the coding technique and asked to code data, the same is done by the researcher and then the results were discussed, that helped to see some differences in the codes, and the coding were repeated, the coverages or definitions also were discussed, and some reductions were achieved while generating new codes. That was the only possibility the researcher could use, since there was not even one peer available to assist on the mentioned coding procedures.

Processing Data: Bloomberg (2012:112-113) states that credibility corresponds to validity in quantitative research, credibility represents the satisfaction level of the participant. Therefore, the researcher needs to reduce and clear the bias s/he introduces, makes valid interpretations, uses diverse sources for corroboration and triangulates the data collected, do not hold on presenting the negative instances, use help of the colleague to check her/his data evaluation manner.

Weighting the data: According to Charmaz, weighting is only acceptable in writing the significances of the codes (2006:71) or weighting the categories through the memos for locating the categories among themselves (2006:85); weighting the data according to its owner (people or organization) (2006:137) is criticized as "Manipulating Hierarchies of Credibility" by Charmaz. She refuses weighting data (Charmaz, 2006:137-140); sees it as an establishment of an order among data, instead she endorses again the "categories and concepts" principle, and instead of giving weight to some codes/data, she proposes the raising certain categories to concepts. She describes the features of the categories that can be raised to the concepts as; theoretical expressiveness, sharpness, nonspecific, connectivity with other categories. She explains that in constructivist approach, 'raising a category to a concept' that refines it and establish the relation of it with other concepts, so that it helps the "abstract understanding" (2006:140) of the relationships denotes "theoretical concepts", which correspond to the "core variables" in objectivist approach. When compared with core variables, theoretical concepts are capable of dealing with more data in a more obvious manner, carries/emphasizes more value more evidently.

Coding: In grounded theory (Charmaz, 2006:186), in opposite to the quantitative researchers (who, assign preconceived codes to data at the beginning of research), the Grounded Theorists (as qualitative researchers) composes qualitative codes to the data they have collected, according to their perception on the data. Charmaz (2006:61), uses two phased coding; open and focused, do not use axial coding, instead she proposes what she developed; categories and their sub categories in a linked form, that shows the relation of them that making sense of the data. Charmaz. In this study, Charmaz's (2006) GT approach is preferred and used.

Coding (Open or Emerging vs Predetermined Codes): Charmaz (Charmaz, 2013, t. 15:54) describes the grounded theory as a heuristic device for learning about the world of researching, which is not a procedural kind of methods to be applied to cases. It works for certain types of documents, works for intensive interviews, may not work for behavioristic ethnography.

Codebook: Creswell mentions about qualitative codebook (2009:187) that collects all the used codes into a table preferably together with the information pointing the place of that coded info in data.

Categorizing: In grounded theory, choosing some codes (by the researcher) to be regarded as higher in significance, so that raising the level of analysis from descriptive level to conceptual level (Charmaz, 2006:119).

Constructivism: In grounded theory, assuming the people (including researchers) as the constructers of the reality in which they participate. Therefore, constructivists do not accept the world as given, instead they inquiry how is that accomplished? They get into the event, acquire an insight, locate it in the big picture with all links and restraints interpretively constructing that event (Charmaz, 2006:187, 189).

Memo writing ('memoing'): In grounded theory, before writing the drafts of thesis or article, the data that are collected are written down preferably immediately after collection process, this procedure is a chance for the researcher to analyze the data while practicing the comparison of his/her codes/concepts/categories/ideas (Theory) (Charmaz, 2006:188). It is done by the author to develop ideas, they are private, "*memos should be private*". Charmaz says the information taken under record by writing and kept chronologically (such as a research diary; a conversation by yourself) are memos about; codes and categories, links between them, gaps, usefulness of category, practical implications (Charmaz, 2013, t. 23:15).

Field codes or field memos; Throughout the interviews, the researcher has taken notes for several purposes such as naming/coding the expression of the interviewee, or upgrading an existent note to a higher category or even to a theoretical code/category level; these were held according to field memos discipline mentioned by (Glaser & Strauss, 1967); the field notes are described as a personal note from the researcher to the researcher (himself) about the thoughts at the moment involved in.

Reflexive memoing journals aim to show the details of data collection, building of the thematic categories, and representation of findings as an evidence of dependability. The software tool Computer Assisted Qualitative Data Analysis Software (CAQDAS) produced most of these evidences automatically.

Theoretical sampling: In grounded theory, a qualitative sampling method, the researcher searches for the people, event or information/knowledge in order to make clear distinction between the boundaries of the categories; the fundamental purpose is to develop a theoretical category in the way of building a theory that is actually

grounded in the data (Charmaz, 2006:189), theoretical sampling continues till widening the route (saturation).

The Grounded Theory Analysis, Manual versus automated Method: After preparatory process, the similarities are considered as a general attitude in the whole, which is of course very valuable to lessen the amount of the data to be processed. The similar opinions/parts of opinions are coded similarly. On the other hand, the dissimilarities are also noted, since these are also very valuable as they are accepted as the signs of the seeds of the solution of the matter if evaluated together with the likelihood of opinions/ the uniformities among the opinions. All these commonalities and unusual opinions are the main and first building stones of the "grounded theory" task (the codes of thoughts/concepts/categories/theory chain of GTM. In manual GT application, which was repeated by the researcher later by using the software tool (MaxQDA), the mapping was used to generate the theory, however, later the diagramming is chosen because of the versality provided by the MaxQDA. It should be useful to note that using diagramming was tried in manual case also, but it could not be sustained on paper with pen, it was found very exhausting, however, when it comes to using a technological tool, the diagramming was the best, because the tool was taking over all the background jobs of the diagramming; in summary, the researcher concluded that using the technological tools especially when dealing with excessive data was inevitable but rewarding in both reaching the results, and producing the report with rigorous evidences.

Building the theory and explaining it to the reader; The results in Grounded Theory: Charmaz (2006:165) states that "The constant comparative method in grounded theory does not end with completion of your data analysis. The literature review and theoretical framework can serve as valuable sources of comparison and analysis. Through comparing other scholars' evidence and ideas with your grounded theory, you may show where and how their ideas illuminate your theoretical categories and how your theory extends, transcends, or challenges dominant ideas in your field."

For the researchers, who used the grounded theory as a method to develop or discover a new theory, theoretical frameworks are the interface to explain that theory to the reader. Therefore, the target reader group is important in building a theoretical framework (Charmaz, 2006:169). In this study, the target reader (the audience) apart from the Committee is the stakeholders of Performance based logistics of Turkish

Aerospace Defense sector, hence the explanation of the theory revealed with this study is designed to their understanding in the following context.

Charmaz (2006) says, the TF actually emerges from the analysis and expressed with sensitizing concepts and the theoretical codes; the purpose is to introduce and explain the discovered theory. Charmaz declares that the said framework needs to do the following;

a) Explain the concept behind the development of the theory, and relation to the other ideas, at least implicitly.

b) Informs about the earlier efforts in this field, and the place of the discovered theory to these works.

The degree that it corresponds to the need of this study; considering the purpose of the study and the use to the said stakeholders of the performance-based logistics.

c) Illuminate the meaning and importance of this new theory.

Charmaz (2013, t. 53:52) states the importance of the language during the GT process that, implicit meanings should be considered carefully.

Charmaz (2006:126) defines *theoretical understanding* as "An alternative definition of theory emphasizes understanding rather than explanation. Proponents of this definition view theoretical understanding as abstract and interpretive; the very understanding gained from the theory rests on the theorist's interpretation of the studied phenomenon.", in this context, the researcher as a theorist in this study prefers using this term as a non-pretentious alternative to theory. Çalışkan (2011) uses "theoretical proposition(s)" term as an alternative way to theory revealed. Fei (2007) uses "theoretical Perspective", "theoretical strands", and "theoretical output" terms in similar purpose. In that context, the researcher uses "theoretical understanding".

Writing the Report in Qualitative Research: This study is not written in a straight way, but as if "a craft practiced by the researcher", generally in a big struggle to learn-adopt-apply-interpreting/memoing (when it got clear)-reporting process, as emphasized by (Charmaz, 2006:10), (Charmaz, 2014:18); writing Grounded theory research is dependent on the researcher, the theorist may write whenever the key insights happens.

2.7.2 Data Analysis Procedures

Creswell (2009:185) describes general qualitative research procedures of raw data in six steps, the first two steps of that description is seen useful and utilized in this study prior to the Charmaz's (2006) process, since the data sets were not transcribed in the first manual analysis, and now those were required to be downloaded into the MaxQDA tool, they follow:

1. Organization and preparation; transcription, typing, sorting and arrangement,

2. Reading/understanding; what is the main idea, tone of ideas, impression, depth, credibility, use of all these data.

Charmaz depicts her constructivist approach strategy of GT (2009:11) in a 'bottom to top' analogy; it is presented in the Figure 2.6 on next page, it was used in this study. Later, the constructivist GTM process of Charmaz (2006, 11), is depicted in various modified graphics by several authors; Randall et al.'s (2015:216, Figure 1) modified block diagram is an example of it; the only difference between the two demonstrations; the second is a lateral and linear (with their saying).

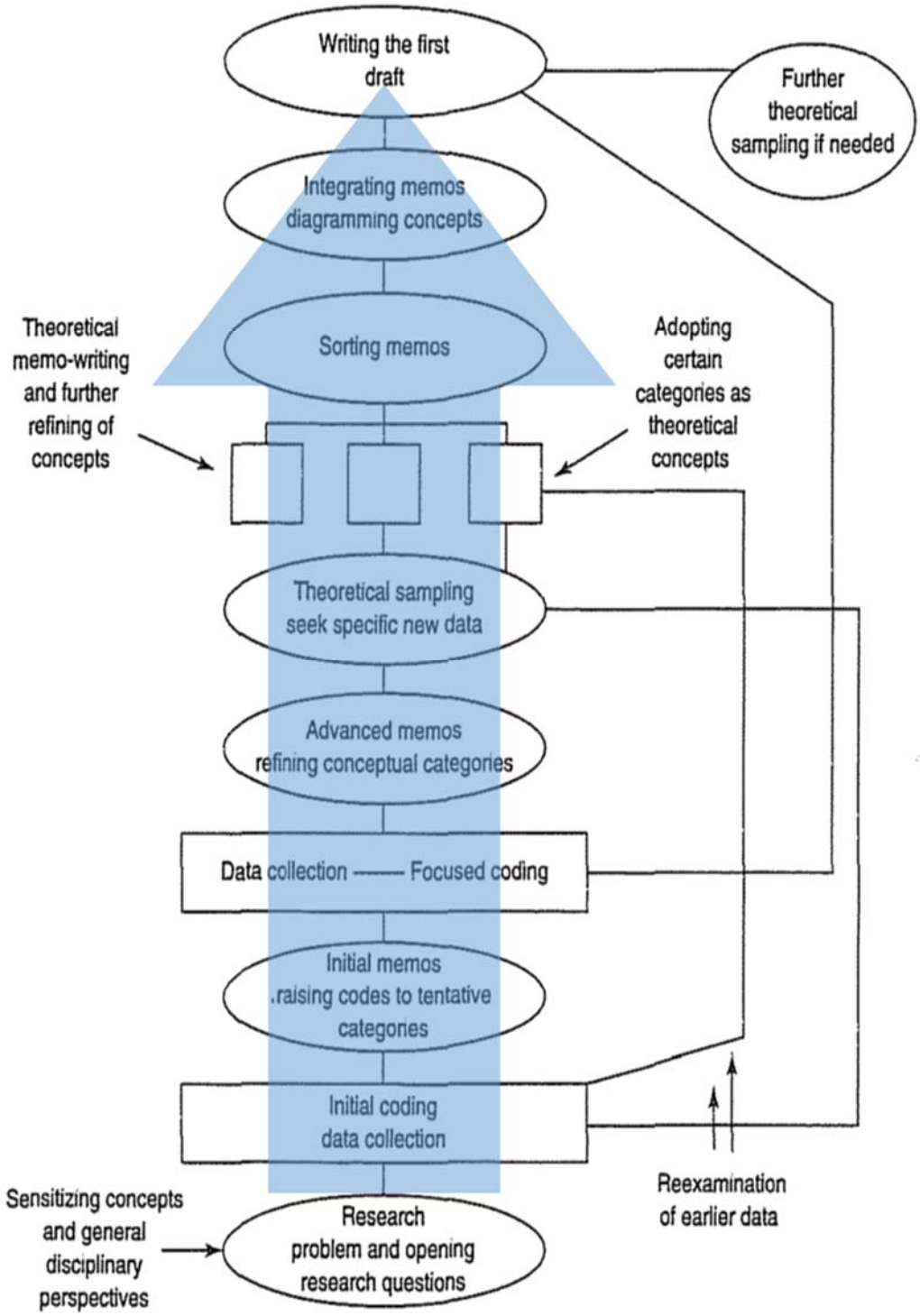

Figure 2.6: The constructivist GT process (Adapted from Charmaz, 2006:11).

Charmaz herself, also modified that diagram once more (2014:18), its adapted version is seen in Figure 2.7 on next page; the difference of the second is to emphasize the constant comparison.

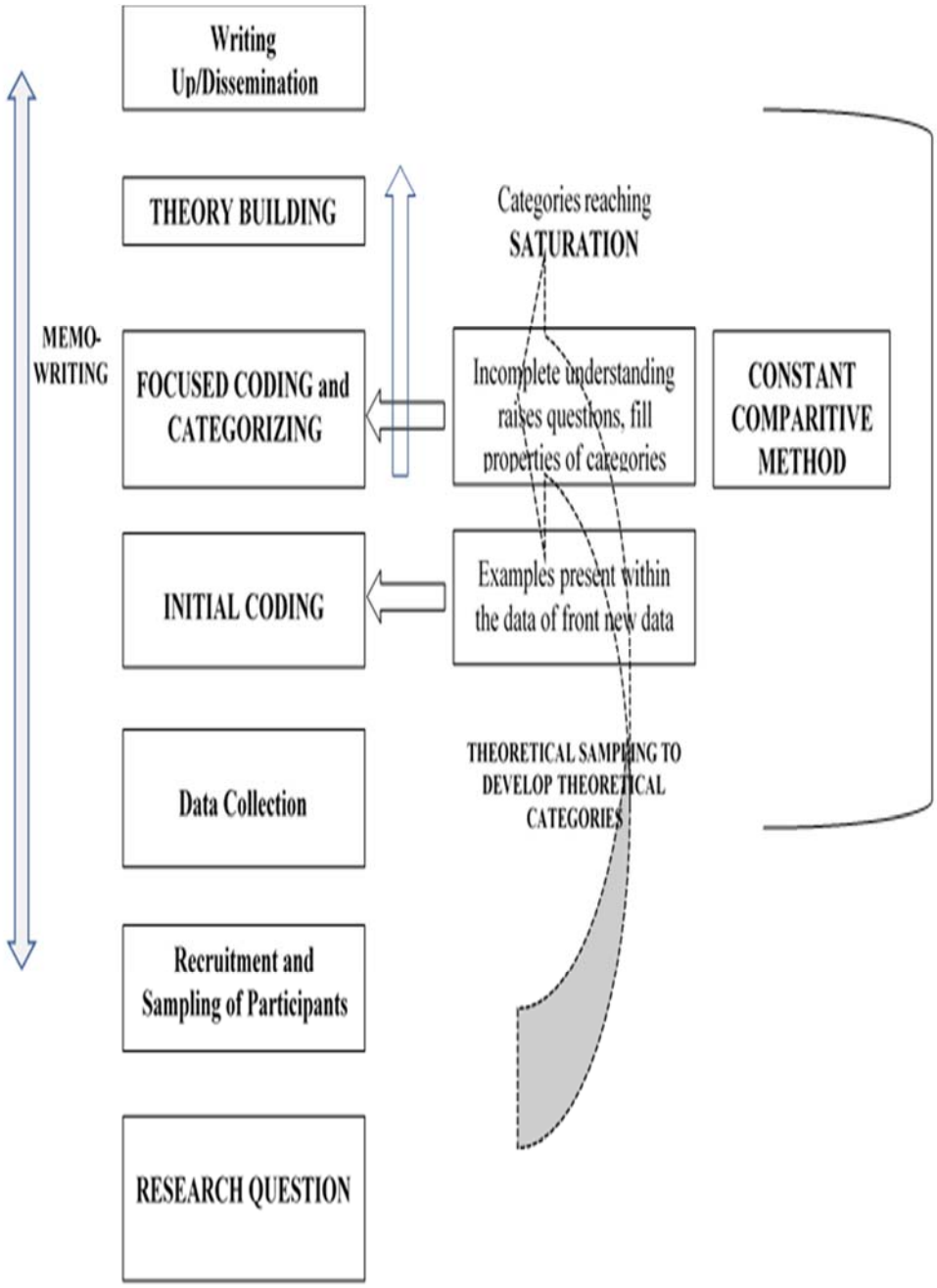

Figure 2.7: The constructivist GT process (Adapted from Charmaz, 2014:18).

Since they are the same, this study uses both as tenet of constructivist strategy in GT, and the process used in this study is described as follows.

Applying the constructivist GTM process into the data analysis; as a part of the GT process, a typical data analysis is depicted in Figure 2.6, and Figure 2.7; 'The constructivist GT process (Adapted from Charmaz, 2006:11)' above. It starts (from bottom in both figures); first step is sensitizing the concepts about the research topic, aiming to understand the disciplinary perspective, it follows the formulization of

research problem and research question(s) of 'the implicit key points of PBL's beneficial applicability in the maintenance of aerospace and defence systems'.

Then, in the second step, the data collection and analysis start; when a data is collected it is given a code to define it or its group (these are initial codings, which are made as "open coding" and are the critical procedure of the GT, where the theoretical code is emerged from) and a note ("initial memo") is written about them (data together with its attributed code; stating the value and perceived meaning(s), and interpretation(s) about its relation to the research problem /question(s)); it is "raising codes to tentative categories". Categories are important in constructivist approach; they constitute the building stones of the theory to be generated.

This procedure repeat itself till a saturation in theoretical sampling is reached. Theoretical sampling denotes the position that, it is felt in the analyses of the initial interview data, no new codes is generated, but all additional data starts to go under the previous codes/categories, that can only be noticed by doing comparisons between the additional data and their codes and the earlier codes: "constant comparison". The comparison of the data/codes/categories is a repetitive procedure in GT.

After theoretical saturation is reached, third step starts, in third step, the researcher can make a request to describe some of the codes more descriptive way in order to make the theory. With other words, the researcher needs to know, or needs to get answers to questions raised in initial coding to describe the categories. This is done through designing a supplementary interview with semistructured questions pointing those codes that were needing more descriptive knowledge from the site.

The procedure of the analysis of the supplementary interview data is exactly same with the initial interview data, except, the codings. Now the codings are done not openly, but in a focused way, focused to the codes/categories that was requiring new data to be more explicit. And, constant comparison is again the key operation of the procedure. Constant comparison is key operation because, otherwise, the data cannot be handled, the process, the GT is worth nothing. But, during the constant comparison, the researcher feels the need to recode, re categorize, rename of the codes/categories, rearrange the ingredients of some/all the categories, to assign/reassign theoretical codes/categories; that comparison is not within a section, but within all the data from the first to the last bit of interview data at all of the comparisons.

When to stop the analysis? In initial interview data analysis, the stop check point was the theoretical sampling, now in supplementary interview data analysis, the checkpoint is the saturation in the categories. Because, that phase (supplementary interviews) was started with the need to saturate the categories, to make them explicit. Hence the data collection, analysis, focused coding/categorizing and comparisons all over continues till the categories saturate.

In an ordinary research study, that much would be enough to continue the process in theory building step., however, in this study it was not enough because the interviewees are talking about their interpretations about the applications of the military logistics discipline, in which their understandings are discussed during the detailed discussions in the last (discussions and conclusion) chapter, Charmaz (2006) explains these situations in constant comparison, while doing the constant comparisons in the supplementary phase, the obtained data may not be adequate to fill the needed requirements raised in initial phase of interview, or, there may come brand new codes (open codes) that need to repeat this second phase all over again. That happened in this study also and a third phase was experienced. Third phase is not different than the second phase, exactly the same procedure is applied.

Having described the main procedures of constructivist GT, it is time now building the theory. Building theory is constructed by memos written during the described earlier procedures, it is the researchers interpretation of the analysis, together with his background consisting of his worldview, experiences, and knowledge.

Writing the theory is not different from the building the theory, plus it needs to focus to the aimed audiences, here they are Jury and the military logisticians consisting of academia, the language is again limited with the researcher's (author's) skills. In that context, the researcher tried to pay the maximum effort, while preparing himself to this position during the all doctoral education (the difficulties are explicitly obvious, writing a dissertation in second language is enough challenge in that context.).

The Study: The grounded theory application can be kept that much within the limitations of a doctoral study, however to polish the study, one more point is seen inevitable by the researcher: the theoretical framework of the theory generated through the GT. It is the blending of the literature review, a deep literature review. Review of the literature is one more time revisited and a theoretical understanding is resumed in place of the theoretical framework of the discipline, which needs another deep research

study in fact. Then the findings of the deep review of the literature is compared to the results that were revealed from grounded theory analysis through categorizing the data in previous steps, and the resultant understanding of the research results of the study are elaborated, described and discussed, and a conclusion was reached. All these steps are depicted in Figure 2.8.

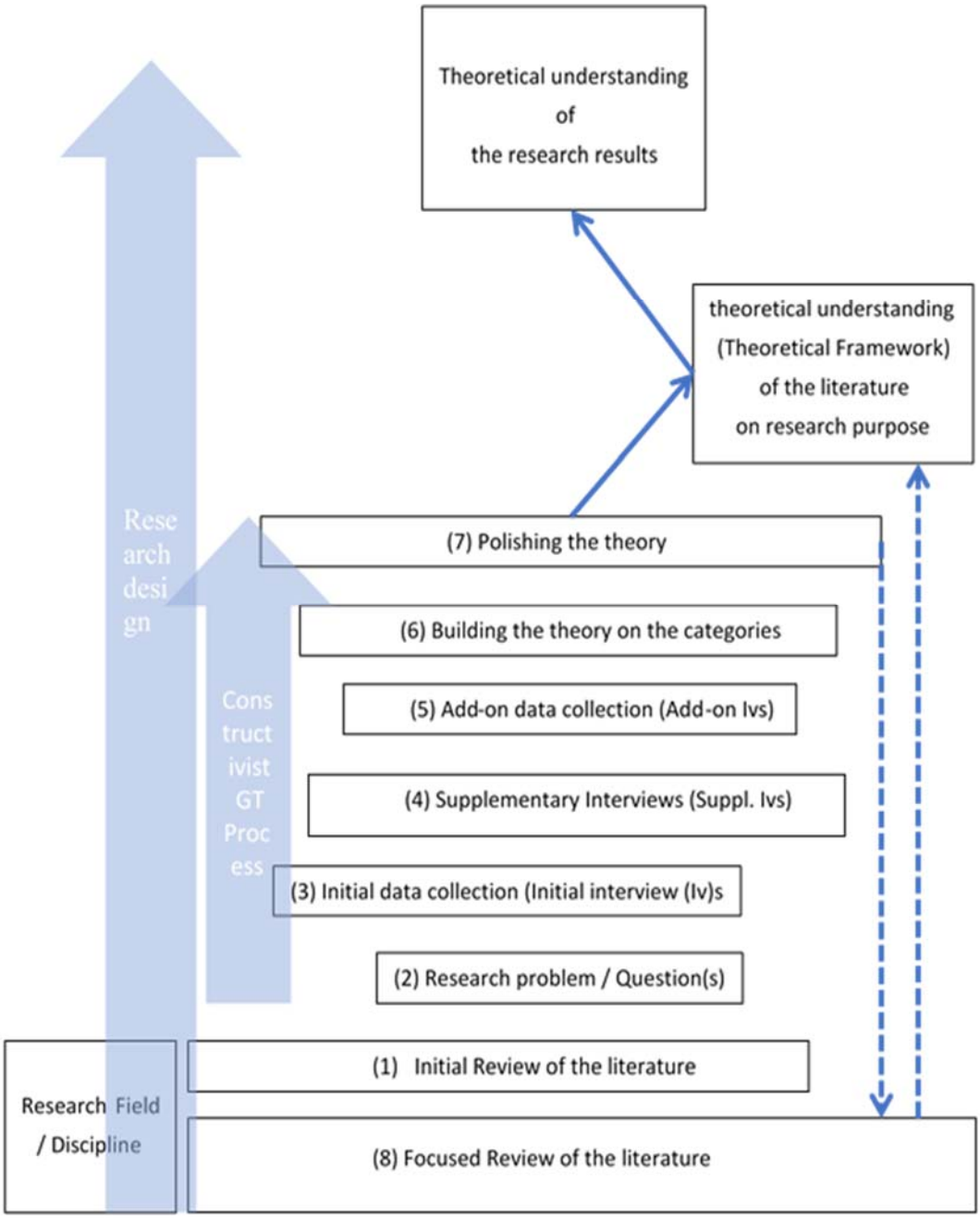

Figure 2.8: Researcher's understanding of constructivist GT, and the resultant 10 step research design.

This study follows that procedures described in Figure 2.8 above.

2.8 The Role of the Researcher in Qualitative Inquiry

Researcher's Role on The Quality of GTM Product is important as Corbin & Strauss (2007:195) highlights the role of the researcher and states that creativity in analysis, a strength for work with precise recalling to fit data integrated; to explore the hidden one. "It is a process of conjecture and verification, of correction and modification, or suggestion and defense." (Morse & Field, 1995:125-126, and Packer-Muti, 2009:141). An objective attitude is shown during the study, and data is handled and analyzed carefully and with creative thinking to find the implicit knowledge grounded in the data during all the phases of the study (see data analysis section).

The researcher's capability and readiness for the qualitative research is emphasized by Glaser and Strauss (1967) and having insight to understand and to attribute correct meaning to data by Strauss and Corbin (1990). The characteristics of a GTM user (theorist) is defined by Strauss and Corbin (1998, p 7) as; willingness and commitment to work, thinking abstractly, critically analyzing the situations, sensitivity to talks and actions, being open to useful criticism, noticing the tendency toward bias, being flexible and open to positive criticism.

Corbin & Strauss (2007:195) highlights the role of the researcher and states that "On the part of the researcher, creative and solid data analysis requires astute questioning, a relentless search for answers, active observation, and accurate recall. It is a process of fitting data together, of making the invisible obvious, of linking and attributing consequences to antecedents. It is a process of conjecture and verification, of correction and modification, or suggestion and defense." (Morse & Field, 1995:125-126, and Packer-Muti, 2009:141).

Charmaz also highlights the importance of the features of the researcher since grounded theory is not gathering data, but constructing data (Charmaz, 2013, t. 08:52 – 48:36). The preparedness as well as attitude and subjective experiences, world view, statute, prestige, power; the identity, time are all important since the researcher is the part of data gathered, perceived, analyzed, and reported. The researcher should be open in mind, with a wide (not narrow) topic; and most importantly has a forethought. Since the researcher cannot be held apart from the result of the grounded study, and the first interviews are up most important to establish the theoretical sampling leads, a preparedness period is inevitable, or with other words, not including a literature review at the very beginning of the report does not necessarily let the researcher not to do a

literature review. It is needed for the preparedness of the researcher to start with the interviews in the way to develop the theoretical sampling, which is needed to build up the main route of the research.

Corbin & Strauss, (2015:29), emphasizes the researcher's philosophies, skills and knowledge, education, interests and vision, experience and professional background effects the product of the researcher; hence although the theory is grounded in the data, it is the product of the researcher and the participants, with other words, with same data, another researcher may come up with completely different theory and both are valid. The important is more theories is better to understand and shape the unknown/problem.

The researcher, having 28 years of experience in various levels management, and in several fields of logistics, even from outside of Turkey is advantageous in most of these requirements. However, he feels the effect of insufficient experience from academia, or with other words, he tried to adopt himself on being able to look objectively, and he made advancements on it during the doctoral education. And, now after many struggles he believes and hopes that, he reached the minimum requirements for this research study.

2.9 Ethical Considerations

Corbin and Strauss (2015:13-14) says, a researcher is ethically responsible to herself/himself, to participants, and to the research (profession) to produce the highest quality of work, s/he can do.

Because of the researchers' deep interactions between the interviewees during the data gathering periods, and the necessity of his/her natural and indispensable interpretation of the data, and findings during the last periods of research, the researchers ethical, visional and personal features are very important (Creswell, 2009:177).

On the other hand, Babbie (2007) claims that ethical or unethical depends on the community, extends the responsibilities to participation in the research (as respondent) and the necessity on being voluntary (although it conflicts with scientific need for generalizability), and defines the confidentiality as the promise of keeping the info private, and pushes to keep anonymity even the researcher cannot identify the owner of the info.

The researcher understands that, In the light of these scientific guidance, the researcher's responsibilities and obligations for a highest work are:

a) Demonstrating community's ethical attitude and behavior (about himself and participants),
b) Keeping the confidentiality and anonymity,
c) Respecting participants' will and choices, opinions,
d) Demonstrating academic/scientific professionalism during the study (demonstrating scientific skills, applying scientific knowledge, and trying to be objective during data collection, analyses, evaluations, and interpretations),
e) Reporting the results as is, accurately and with errors, limitations, or shortcomings.

In this context, an exceptional care has been kept on this study for ethical considerations, and the following are noted:

1. No demographic information (such as age, gender, address, living conditions etc.) is required in this study, therefore it is not needed to take an approval from Ethics Committee.

2. The interviewees, all of them were informed about the study; subject, content, the purpose, and their rights. Additionally, consent of each participant was received (see APPENDIX B and APPENDIX C).

3. Moreover, they were given the assurance of privacy and confidentiality described in law 6698. (The interviewee candidates were asked at first step if their names may be used in the study; some of them approved this question affirmatively, on the other hand some other participants have not given such a permission. Therefore, to protect the anonymity of the first group, no personal name or identification information is used in this study. Additionally, all the participants are given a pseudonym for referring when needed in the study. And finally all the participants were informed that "All the data and knowledge you provide in this process are used, processed/analyzed and protected in accordance with the 6698-numbered law about the 'Protection of the personal data' (28 b and c); only for the scientific/academic purposes, only by myself, as described in this law and after legal obligation they all be completely destroyed." This is the researcher's honor, to keep and use that information as described in the consent form and the law 6698. The real/genuine records of

interview notes are kept in safe by the researcher, and any (lawful or academic) inquiries should be directed to him with all the clear rationale and aim; He can be reached from the contact information provided in the proper place(s) of this study.).

2.10 Limitations and Delimitations

2.10.1 Delimitations

This study is delimited to defense-aerospace systems' logistics sector in maintenance area.

Note: Performance-Based strategies have found place in use in several industries especially after 2000s; defense, manufacturing, healthcare, roads, transportation etc. (Randall et al., 2015:213, Table 1). However, the maintenance concept in defense logistics represent a whole logistics system needed to ensure the effective and efficient usage of military systems, hence the term "maintenance" includes all the relevant infrastructure related with that specific defense system; therefore in this context, the maintenance concept mentioned here is/may be different than other nonmilitary sectors or the maintenance concept in other military logistics (such as navy, army, or General Directorate of Security) and generalizing the results of this study may not be appropriate to them.

2.10.2 Limitations

The results of this study may not be directly generalized to other branches of military systems' logistics in PBL implementations, but, this study in its integrity, together with analyses and constructed theoretical propositions that altogether are presenting a big-picture of the confrontation of PBL at current situation in Turkey, may give insights to those branches of military systems' stakeholders to adapt the PBL beneficially and applicable way.

2.11 Trustworthiness (Reliability and Validity)

Since this study is a qualitative research, the reliability and validity issues needed to be studied very carefully and be integrated into the study. However, the terms are different than the reliability and validity terms in quantitative measurements.

"Reliability and validity are salient because our constructs are usually ambiguous, diffuse, and not observable" says Neuman (2012:212) while emphasizing the importance of the dependability and consistency, and truthfulness. He (2012:218) points out the necessary factors as using various techniques, being consistent, stable, and repeatable (letting others to repeat what is been done). Credibility, dependability, transferability, and confirmability are four criteria of trustworthiness concept of qualitative research that correspond to the reliability and validity of quantitative research.

Credibility: Credibility is associated with internal validity in quantitative research; Merriam (1998:x) mentions six techniques, later Strauss and Corbin (2008) listed four techniques for credibility: triangulation, peer debriefing, reflexive memoing and member checks. Patton (2001:14) states that, credibility of a qualitative research is the ability of the researcher.

Dependability: Dependability is the stability of data in time and consistency of data collection methods and findings. Bloomberg (2012) takes dependability for the reliability in quantitative study, although it cannot be proved by a statistical process. In qualitative study, the dependability represents the traceability of the data collection and translation process; in other words, it requires the researcher to describe how the data is collected and analyzed and make it accessible if not possible to present in the report. Also, checks his/her consistency on coding and analyzing by asking a colleague to code a few interviews.

Transferability of The Study: Transferability in qualitative research corresponds to external validity of quantitative researches; deals with the explanatory aspects of the study and requires tick description. Denzin in his work dated 2001 (as cited in Bloomberg: 113) mentions about the transferability of a study and explains that it can be provided by a detailed description of the study, and the objectivity in quantitative study is taken as comparison of confirmability which requires keeping the records of notes and transcripts.

Confirmability is to ensure that the results are produced through the inquiry, it can be evaluated through audit trial.

The understanding of the requirements of the reliability and validity deeply related to the design of the research study, the maximum care is payed to integrate the trustworthiness into the proper sections of the design starting from research question,

to the analysis and interpreting the data collected till reaching the grounded theory aimed.

Triangulation: Triangulation is using multiple (more than one) research methods in the study of a subject, to increase the reliability and validity of the research study; closeness of the findings to each other denotes higher reliability and validity. Creswell (2014:251) proposes the researcher using a strategic approach to enhance the accuracy of the study; and Triangulation is among the one of eight strategies he recommends. Creswell (2014:259) also recommends triangulation of data by gathering it from different sources such as interviews, observations, and analysis of case/literature document to ensure internal validity. "Grounded theory uses the literature to position and scope the broad themes involved in a research effort." (Randall et al., 2010:36). Aiming to emerge a grounded theory or understanding of the PBL adoption, PBL adoptability is investigated within this study, by collecting and analyzing the logistics authorities' opinions by utilizing GTM that was such a broad theme, hence making a focused review of related literature will help to position that broad theme.

In GTM studies, the literature review "goes beyond a short section of paper or a chapter of a thesis" Charmaz (2006:167); within that context the relevant literature review is done in-depth for checking the results of the GTM findings positively and affirmatively in the adoption of the performance-based logistics to:

a) Check and clarify ideas,
b) Make the challenging comparisons till covering all the results of the GTM analysis,
c) Invite the reader(s) (all the stakeholders) for a theoretical discussion,
d) Show the position of the work in the literature.

The focused review of the literature is designed into the study as a triangulation tool also, triangulation of the interview data was carried out through the comparison of the GT results.

The triangulation is also described as a tool to increase the reliability by providing the capability to take measurements from wider spans of conceptual definition (Neuman, 2012:214). This study is designed on looking from the viewpoints of all the stakeholders; the interviewees are planned to ensure the sampling of all those representatives opinions.

Contradiction on the Quality Assessment of the Study: The quality assessment based on and requires preservation of the evidences, which somehow contradicts the principle of the keeping the anonymity of the participants as the case in this study that requires the destruction of the evidences after the completion of legal requirements. In this situation, the only way to achieve both conditions are the testimony /arbitration of the advisor, beside waiting the duration defined in legal obligations.

The entire process of grounded theory, which is interpretive (instead of positivist) and constructivist (instead of objectivist) and following subsequent activities as Charmaz defines (2006:148) looks complicated especially for the audiences, generally they see the process is blurred with the final product. They judge on the usefulness of the grounded theory methodology by looking at the quality of the final product.

Charmaz (2006:182) defines some criteria as a sample to measure the quality of GTM studies. Charmaz (2006:182-183) refers to Glaser's (1978:4-5) criteria of "fit, work, relevance, and modifiability", and adds some more other criteria to count "disciplinary, evidentiary, or aesthetic issues". Strauss and Corbin (2008,) accepts Charmaz's criteria to check the scientific and creative features of grounded theory studies; which checks credibility, originality, resonance, and usefulness. That criteria about the application of the grounded theory are given in the following table with features grouped under Credibility, Originality, Rapport (Resonance), and Usefulness; Table 2.3 on next page.

To enhance the trustworthiness of this study, these criteria and techniques are used whenever applicable in the possible extent. Additionally, as being a GTM study, the Charmaz's criteria is utilized as a guidance during the development process of the study.

The criteria developed by Charmaz to measure the quality of GTM Studies is presented on next page.

Table 2.3: Criteria to measure the quality of GTM Studies (Adapted from Charmaz, 2006:182-183).

Feature
Credibility/Reliability:
1) The understanding the research subject,
2) Sufficiency/consistency of the gathered data to evaluate the revealed results,
3) juxtaposition of the obtained results with the categories derived,
4) Sufficiency of coverage of empirical observations,
5) Existence of rationale behind abstract relations between gathered data and the derived output/results (theory and theoretical understanding).
Originality/inventiveness:
1) Existence of novel abstract interpretation of the data. Existence of novel categories,
2) Social and theoretical importance of the study,
3) The art and outcomes of application of the grounded theory to the research matter (how well is the grounded theory matches and helps in refining concepts/ideas/theories/practices in the research issue).
Rapport/Resonance:
1) Does it help to match the categories with the fullness of the experiences studied?
2) Does it help to reach the liminal as well as unstable, taken-for granted meanings?
3) Does it help to identify the links between lives/personal professional lives and institutions? *(Adapted and extended by the author)*
4) Does the grounded theory help to research participants also?
5) Does the research outcome (analysis) of the grounded theory offer the participants deeper insights about their lives/professions and professional worlds? *(Adapted and extended by the author)*
Usefulness:
1) Potential of the study's contribution to offer new looks of other parties to use in practice OR professional daily job activities?
2) Potential of the study on suggestion for any generic process?
3) If yes, are these generic processes examined for tacit implications?
4) Potential of the study on triggering new researches?
5) Potential of the study on contribution to knowledge / practice?

Peer debriefing, external auditor, and member checking/ informant support: Creswell states the importance of having peer examiner, having an external auditor (2009:192), and having member checking and/or participatory modes of research (Creswell, 2009:199-200) to ensure the internal validity of a qualitative study. During

the study, all of these were utilized to enhance the overall validity of this qualitative study.

As an external investigator, an Associate Professor with military background and knowledge and experience in the military logistics has been contacted by the Advisor's proposal; by all means more than a peer debriefer, the work as a qualitative study, and the appropriateness of GTM on this study has been discussed in detail several times. Additionally, another Associate Professor was contacted through the first (external investigator) academician; who is well in GTM but has not any experience or interest in logistics at all. The GTM analysis phase has been discussed in two sessions; mostly about the consistency of the research purpose and question. These consultations were very useful and productive for the researcher. They did not perform any coding or hypothesizing, rather they have just checked/elaborated the works been done and the way the researcher planned on the research, the works to be done; those reviews/consultations and their feedbacks provided inner confidence in analysis to the researcher, besides some very useful tips in analysis and the overall study (such as the appropriateness of GTM, and the research question, that the last shape of the research question had not been finalized then). Those reviews emphasized the researcher's insights to build the theoretical samplings in qualitative research and other GTM application issues, their feedback was an assurance on the progress of the analysis, use of the software tools and construction of the theory wise.

Moreover, and as the most crucial audit was held by a Professor; the first theoretical sampling; the data sets, procedures and the whole data analysis process, including the detailed procedures of constructing the theory and its theoretical proposition(s) with all the intermediate reports including charts and graphics were briefed to that Professor, who is experienced on both military logistics and qualitative research, as well as GTM. The professor encouraged the researcher on the way he is progressing and made several suggestions. That was a real contribution on building the confidence needed on the completion of the analysis for the researcher.

As last but not the least, from the very beginning of the study, another peer support was taken in a special way. The process of coding, comparing and choosing the codes to be raised to categories, and even building the theoretical propositions were carried out and elaborated with a High School Turkish Literature teacher with 25 years' experience, and currently for the last two years working as an editor in Ministry of

National Education as nominated officer in the educational and training materials examining committee. Two kinds of checks were performed with that expert; at first stage coding transcripts separately/independently and comparing the results, then at second stage discussion the differences and coding together. In the first stage, the same transcripts were coded by both of us separately and then the results were compared, it was seen that the results were either similar, or there were differences resulting from misinterpreting either the topic or the response. The second stage was more useful and was ensuring coding correctly since the response was discussed between us, this was helping to catch the new concepts grounded in the transcript. The codings were done accordingly, if it is in the first cycle of Charmaz's coding procedure "open coding", and if it was on the second cycle "focused coding" (by recognizing the expressions that fit into the codes derived before and placed in the codebook) were used, and whenever new expressions are noticed that may lead to new theoretical samplings, they were coded openly again.

It should be noted that, finding an available peer was difficult because of two reasons; one, there is not many people that can understand and interpret the opinions in military logistics and capable in qualitative analysis, two, to arrange all of these conditions was undoable within the doctoral study timeframe (there would be a peer in required features, however the probable candidate was very busy at that timeframe). On the other hand, if looked from other aspect, although finding a peer capable of doing GTM in military logistics and having good English language ability would be an advantage, but would not be counted as an issue, indeed the opinions and their transcripts were in Turkish language; in that case making the coding in Turkish would be a better choice to start with, then the interpretations, theoretical samplings and theory building could be done in English; it is chosen, and that way my spouse could participate in codings, discussions, and the comparisons; that way provided me the most proper assistant that I needed. Indeed, except only one set of data, all interview data and their transcripts were in Turkish language already, and that gave an opportunity to the researcher to get assistance from the spouse in place of a peer. In summary, as Charmaz (2006) describes in her "constructivist" approach of GTM; in both open and focused coding and peer debriefings, peer reviews, discussions with a disinterested peer, discussions with familiar peer sessions of theoretical sampling phases of the GTM analysis, including creating themes as Johnson states (1997) were

carried out with the "peer" support; the participation of this peer in interpretations and discussions gave exclusive insights and as result, that case assisted to improve the credibility of this study. As last note, the identities of the participants were already coded by the researcher while transcribing the interview data to protect their personal information. The only disadvantage of this way was the researcher's ignorance using the English language in writing the memos; unintentionally, the memos were written in both languages during the GTM analysis as that was seemed natural during the process, but however it became double up the work when starting to write the report because of the language issue, it was then noticed. However, indeed, when a researcher does a study in his/her second language, the researcher needs to express her/his works in both languages; therefore, in that context, using both languages even repetitive manner, should not be counted as doubling up the work either; hence, repeating some steps in both languages helped practicing to express it in both languages, as well as to enhance the analysis.

In summary, to increase the trustworthiness:

1) Clear Purpose: During the first stage of the, the purpose is clearly described as "beneficial application of PBL",

2) Comfortable atmosphere: Interviews took place at decided timeframes in the offices of the interviewees, or in comfortable patisseries or coffee houses, the interviewees were either in host or guest position. Both host and guest were in good atmosphere.

a) Inferences and personal reflections: The researcher being an experienced in the field, has no problem in the communication, all the interviews were free from inferences and personal reflections.

b) Time adequacy of the interviews: This would be thought as an important issue may be difficult to resolve when considering especially some participants, however it was not an issue generally. First, all the interviews were planned beforehand, therefore the participants devoted their time to this interview. Second, during the interview invitation either by telephone or e-mail, the invitee was informed about the purpose of the interview, the duration required, and the study. Additionally, they were asked about their needs to make themselves ready for the interviews, If the interviewee asked, a detailed information is provided., otherwise the

invitation letter prepared according to the interview protocol rules was sent (see Appendix B and for Turkish version APPENDIX C). The time for the interviews were not a problem, however one time the interviewee was called to an emerged (last-minute) meeting; the participant (I07) had a meeting emerged at the last minute that overlapped to the same timeframe with planned interview; within that waiting timeframe the researcher made an unstructured opportunity interview with a new participant (I98).

c) The interviewee invitation documents package (The interview protocol): The invitation package consists of invitation letter, consent form, and the list of the subtopics indicating the subjects of the interview. It should be noted here that; the interviewees are executives or their experts (right hands) generally; they may want to know beforehand the topics to be talked in the interview. In that respect the detailed guidance that was planned and prepared for the researcher's own (not to overlook the focused data research in the supplementary interviews). use was sent. One such a case occurred.

3) The triangulation is provided through comparing the resultant theoretical understanding of GT analysis with the theoretical understanding of the focused review of the literature review.

4) Additionally, to increase the credibility, the following measures are followed.

5) Purposeful selection of participants: The interviewees were meticulously and purposely selected from the existing range of all stakeholders (knowing them closely, all the participants are the most appropriate people of all these stakeholders).

6) Prolonged engagement: The engagement with the stakeholders started in late May 2015 and lasted till August 2017.

7) Persistent observation: The researcher belongs to the logistics field as having 28 years of background in it; therefore, it is easy to observe the field in comparison to another researcher that is not from the field.

8) Thick description: All the detailed descriptions of the phases of the study (possible in the extent of anonymity) are explained in the report.

9) Confirmability is an issue of the approval that the results reached in this study are the product of this study. Within the last phase of doctoral program, two Professors (one is the advisor, and the second is the external auditor) and two committee members took the responsibility on the thesis, and they all are the close witnesses of the study, additionally the external investigators (two Associate Professors) may strengthen the evidence also; the results are found out at the end of the analysis by the researcher; the purpose of the study and the semi structured interview guide are enhancing the evidences.

10) Charmaz's (2006:182) GTM criteria was used as a guidance and performance indicator during the development of this study (See Table 2.3 above in this section).

CHAPTER 3

ANALYSIS AND RESULTS

In this study it is aimed to construct a grounded theory exploring the hidden factors for application of PBL strategy in new countries. The constructivist approach of GTM (Charmaz, 2006) is used to analyze the data. The empirical data is collected from the active or retired authorities/ experts of the defence logistics stakeholders in Turkey through the unstructured and semi-structured interviews. The interviewees chosen from the stakeholders, who are considered as a social system living in the defense logistics system; therefore, GTM analysis of those interviewee expressions are accepted as the indicators of the stakeholders' reactions to the PBL applications' status which is the focus of this study. In other words, in this study the social environment of the Turkish military logistics system is examined. The opinions of this social environment are then used to theorize the findings to explore the factors of the beneficial and sustainable PBL implementation to the aerospace and defense systems. Hence, this chapter is arranged under three principal subsections as description of GT analysis, the findings and the resultant theoretical understanding including theoretical propositions, and an evaluation of findings with insights from review of literature.

3.1 The Description of Analysis

In this study, the three steps that were described in '2.7.2. Data analysis procedures' section is followed, the procedures are briefly described here with insights of the researcher.

The data analyzed here is taken from Initial (10) interview transcripts (later, the data from (19) supplementary interviews and special additional (4) interviews transcript also) are also included in the analysis in MaxQDA tool.

The MaxQDA is a versatile tool even for making comparisons among the participants. therefore, MaxQDA is chosen as if a coding is being done by a theory (a mainframe); the researcher has first established codes, and then marked the participants having that code. The background data, which constitutes the mainframe is kept hidden by the researcher in a special file, and personal information are kept anonymous by the researcher. Therefore, the link between these data and the participant is subject to terms of law 6698.

Computer Assisted Qualitative Data Analysis Software is used in this study to assist GT development. CAQDAS products are capable to support qualitative analyses in two different manner; either by assisting quantitative analysis of the qualitative (textual) data (by counts or frequencies of words etc.), or through assisting in coding.

The "assisting in coding" feature is especially useful in GT analysis by increasing the efficiency and accuracy. In coding the text (transcripts of interviews for example); they provide tools for easily coding (the themes/phenomenon/relationships etc.,) and then combining/retrieving/analyzing/memoing them or their intersections till building theories (Lewins and Silver 2006) cited by Randall (2015, s. 215).

Among many alternatives, MAXQDA 2018 (VERBI Software. Consult. Sozialforschung. GmbH Berlin, Germany) is preferred as it is found most supportive and newest at the time needed.

Although Yin (2011:177), points out the risk of using software; as additional care to follow the procedures which indeed easily cause to lose energy, analytic thinking etc. that endanger the research since still the researcher is responsible from all the analytic decisions, even the software is used; Randall (2015:215) referring Glaser (1998) and Charmaz (2006), affirms that MAXQDA is an appropriate tool, it helps to produce maps/trees of the codes/categories in an efficient way by utilizing its storage and organization features in data.

The GT analysis in this study is done by MaxQDA tool, a snapshot of the screen is seen in Figure 3.1 on following page. In that figure, as the codes can be noticed, the Turkish language is used to get assistant in coding from an expert teacher of Turkish literature, later on the study was transferred into English language.

An exemplary page of the codings on the data, and memos generated during the analysis are shown in Figure 3.2, and in Figure 3.3 respectively.

Afterwards, the codebooks generated in this study to analyze the interviewees properties, and the main purpose are presented in Table 3.1, and Table 3.2 respectively.

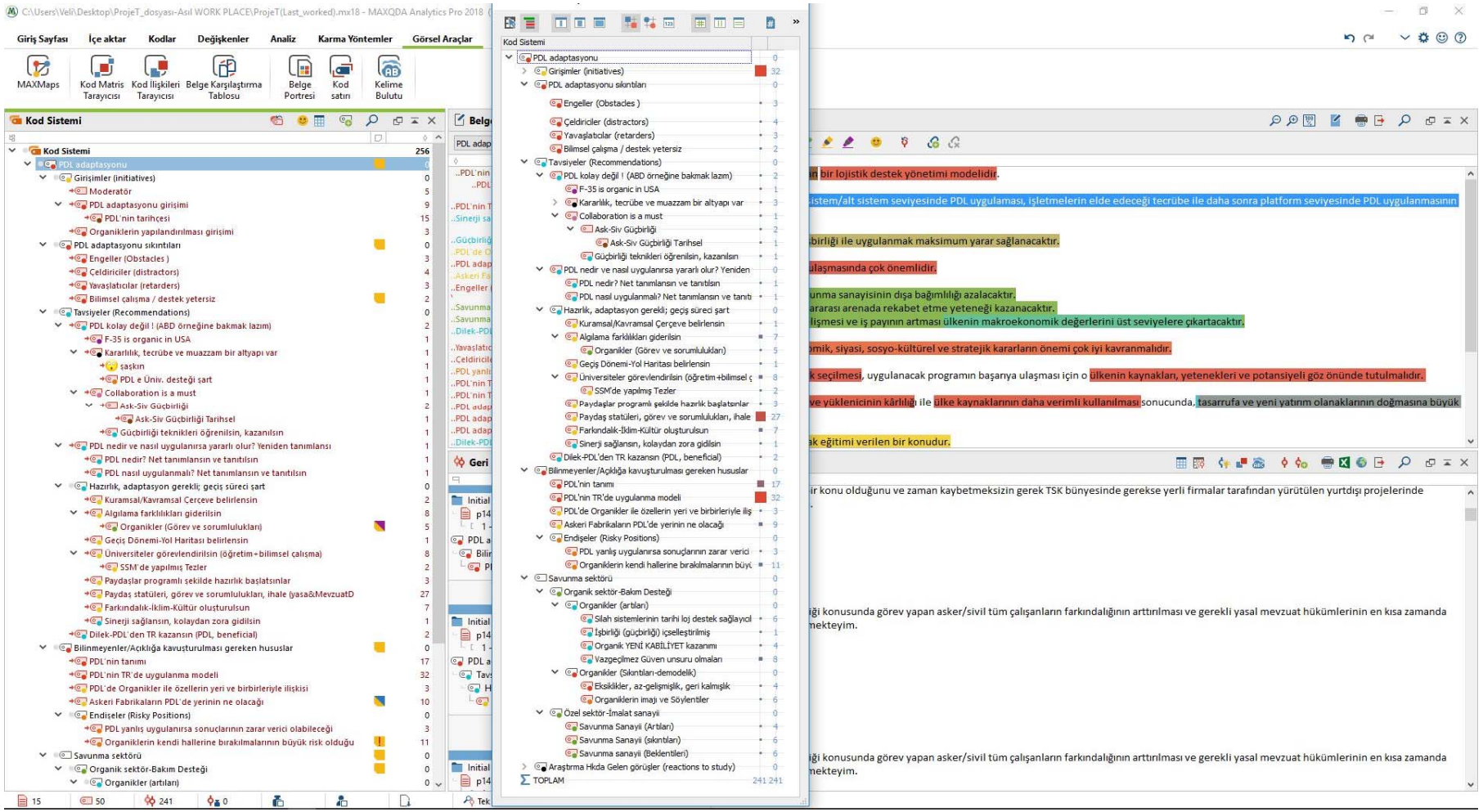

Figure 3.1: A snapshot of GT analysis process thru MaxQDA.

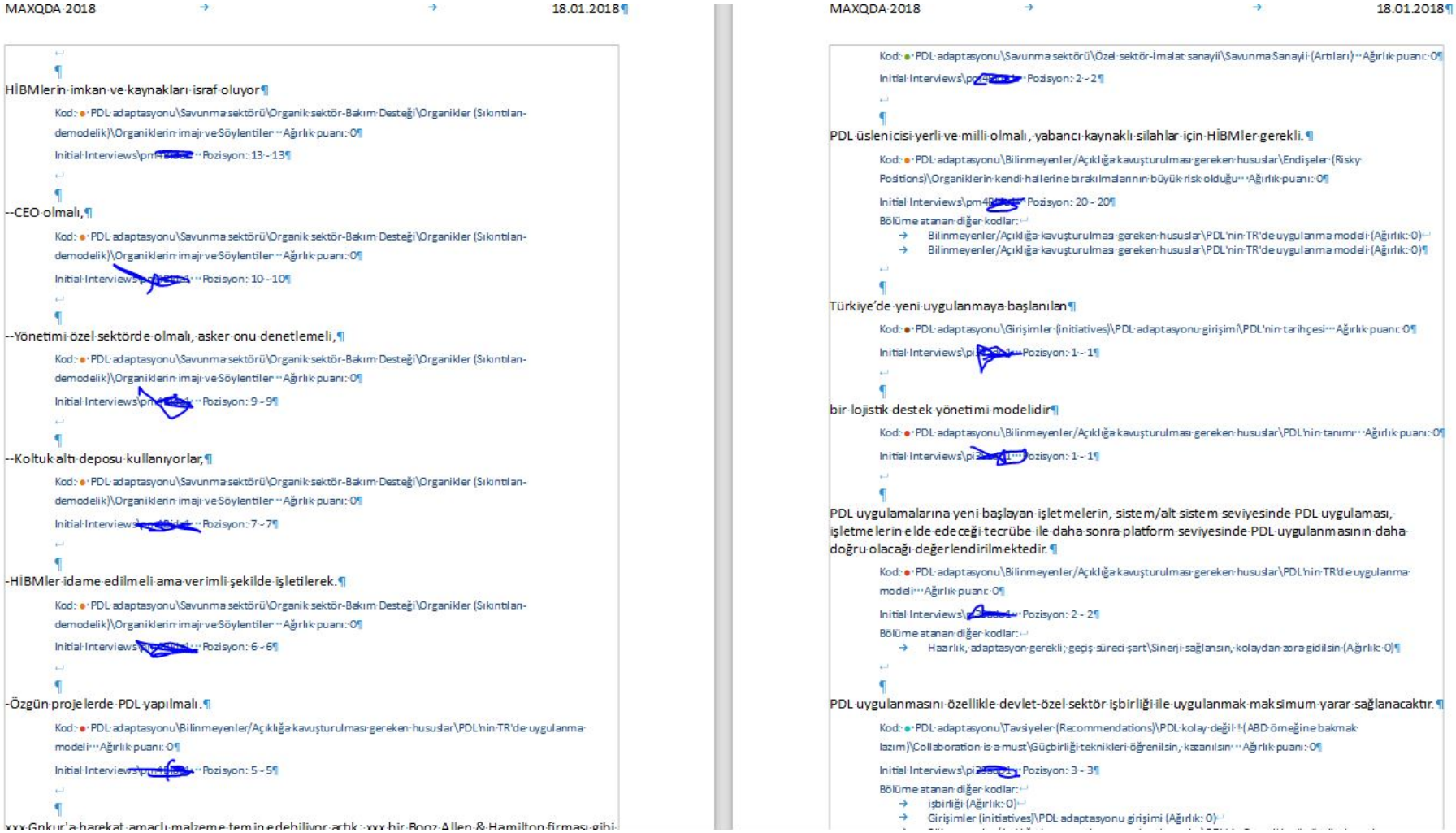

Figure 3.2: A snapshot of open-coding samples on original data excerptions (Tool: MaxQDA).

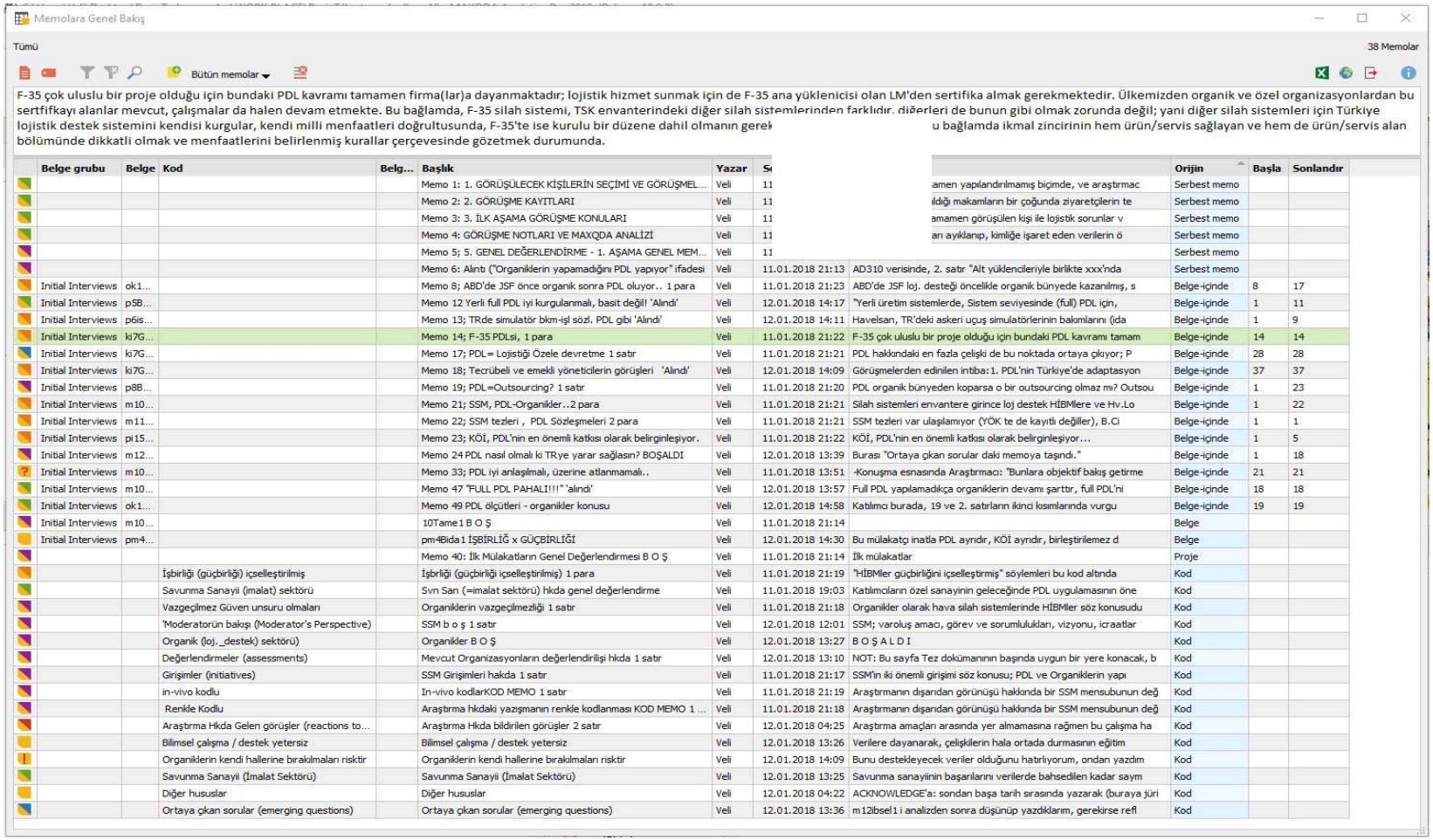

Figure 3.3: A snapshot of the list of the memos generated during the analysis.

The data sets obtained from interviews were analyzed by utilizing the Charmaz's constructivist strategy process (See Figure 2.6, and 2.7 in Chapter 2 (METHODOLOGY), by following the process details highlighted in Section '2.7. Data Analysis Process', and procedure details described in '2.7.2. Data analysis procedures'.

The first step, having been already sensitized to the research topic, aims, questions, and a general understanding of the literature was passed, the second step was started; data collection and analysis. In second step, as described before, the data were collected within 18 months, and analyzed manually, therefore the procedures now were carried out one more time by utilizing a professional software tool, MaxQDA. After completing the redaction and transcription of the interview data, all the data were re-read, and the texts were redacted and transcribed/reviewed the existing transcriptions as the expressions of the participants (In manual analysis, not all the data were transcribed; especially the initial interview notes). The collected qualitative data, is unique at each and every different set. Therefore, especially some sections and examples of those gathered data are presented at APPENDIX D: ‘Some Non-Personal, Anonymous Evidences of the Study.

Then all the transcripts were uploaded into MaxQDA tool. The codings were much easier in respect to the manual method, where especially the initial interview data were kept (by researcher's decision) in papers, and the codings were done by colorful pens, and then the codes were transferred into codebook, as well as to a bigger sheet for mapping purposes. The tool was doing all these perfectly with its data storage and processing features embedded in a quite very user-friendly way. The evidences of the work were easy to transfer to the report.

Note that, the analysis of the interviewee features were described in previous chapter already; it was also performed through the mentioned tool, in analysis the predefined codes were used although still there was new emerged codes in categorizing to understand and describe the features of the interviewees such as chitchat, rejection, appointment, assistance, not evaluated, refrainment, image of curiosity, procrastination, not answering/lost, notification, the codes generated, which are depicted by bold characters in 'Codebook;-Interviewees Codes' table on next page (Table 3.1). The number of the codes used in interviewee analysis was 55, the total frequency was 159.

Table 3.1: Codebook;-interviewees' codes.

Major categories	**Focused/Derived Codes**	Coded sections of all documents
	Analyses of Interviewees	0
A. Belonging Stakeholders	Moderator	9
	Institutions (Univ./Acad.)	6
	Foreign	2
	2 specials (Org-Priv, -Univ)	4
	Private	7
	Organics	2
	User	3
Affirmative responses	Iv 1	10
	Iv 2	25
	Special add-on	4
Analyses of Interviewees	II. RESPONSES	0
	I. Invitees, Affiliations of	0
	III. PARTICIPANTS- Professional backgrounds	0
B. PBL KNOWLEDGE	I've written article(s)	2
	I got education in USA (DAU...)	4
	I taught PBL ("practical teaching in organization" counts here)	12
	I've prepared contracts	5
	I've worked on papers	7
	I've master's degree	5
	I participated to conferences &seminars (as listener)	3
	I've learned "by myself" (everybody may count here)	22
	I got education in TR (either mil. courses, or SSM courses)	2
	I do not know much, Researcher explained	4
	I've participated in international mtg.s	6
	I've prepared and presented papers	7
	I've directed PBL contract	5
C. PBL EXPERIENCE (2+ years)	Conventional Logistics work/study (2+ years)	24
	PBL work (2+ years) in abroad (in projects)	2
	PBL work (2+ years) in TR (in projects)	9
	PBL study (2+ years) in abroad (Office work)	2
	PBL study (2+ years) in TR (Office work)	12
I. Invitees, Affiliations of	2 Specials (Org-Priv., -Univ)	12
	Foreign (Org.+ Foreign)	2
	Private	16
	Organics	10
	User	7
	Moderator	12
	Institutions (Universities/academia)	9

Table 3.1 (Continued): Codebook;-interviewees' codes.

Major categories	**Focused/Derived Codes**	Coded sections of all documents
II. RESPONSES	Justification (apparent, disqualify/delimitate)	0
	Affirmative responses	0
III. PARTICIPANTS - Professional backgrounds	C. PBL EXPERIENCE (2+ years)	0
	B. PBL KNOWLEDGE	0
	A. Belonging STAKEHOLDERS	0
Iv 2	Iv 1 add_on	6
Justification	*chitchat*	7
	rejection	0
	appointment	3
	assistance	10
	not evaluated	3
procrastination	*refrainment*	7
	image of curiosity	2
rejection	*procrastination*	0
	not answering/lost	1
	notification	2

The GT analysis were carried out in two distinct stages. At first stage, the data gathered from the initial interviews were analyzed by open coding, without using any codebook or predetermined codes; either line by line, or word by word according to the transcribed expression of the participant. Having the same analysis made before manually, this time the researcher picked up one of the data sets that is richer in the answers (as not all the interviewees answered all the questions comprehensively; however, at the first time there was not such a possibility, since the data was analyzed at the first instant, before entering the next interview). The first data set's analysis helped to obtain a rich coding/categorizing, and, (although it was not an issue,) choosing that set helped to speed up the understanding through a refreshment of the details of research subject and interviews.

There were not any predefined codes in the initial interview data analysis; all the codings were done by using 'open coding'; just coding the data piece/sentence/parts according to the ingredients expressing the participants opinions as the researcher understand. The notes and memos from the earlier-manual analysis were used in maximum extent in all the analyses and new memos were generated during the analysis, at the very instant coding a data portion, or categorizing (conceptualizing) a

code, or trying to raise a category to a 'theoretical concept' and reviewing/repeating these all during the application of constant comparative method till reaching a saturation in the theoretical samplings and defining the data needs, it was the end of second step. The initial data collection and analysis is pursued to reach;

1) a core theory (mainframe in a diagram expressing the concepts in the data analyzed and their relations),

2) a data structure showing the new data needs (to build a set of questions for supplementary interviews, which was semi structured).

The results of the initial data analysis were not different on the resultant description of the needed data for supplementary interviews, hence the data collected previously was perfectly fit and ready for the second part of the analysis. The data need for the supplementary interviews are designed according to the initial data analysis, and it is shaped on the researcher's understandings and needs as described in the previous chapter in line with Charmaz says (2006).

Third step (as defined in section 2.7.2.) was supplementary data collection and analysis. The supplementary interview data collected previously then started to be analyzed, and it used the "focused coding" in the same context. The analysis of data sets of the second stage of interviews were carried out in equivalent manner, however this time focusing coding was applied. Additionally, six participants have responded to the last question of 'Do you have any additional comments on PBL?' and expressed their own thoughts about the PBL, and its applications, and their opinions on a beneficial PBL concept. Those part of interview data were handled as the initial interview data.

The codes generated in the initial analysis and used in supplementary analysis are shown in Table 3.2 on next page.

During the supplementary analysis although was rare, a few new codes were generated such as 'Strategic partner' (as in-vivo code), they were shown by bold letters in codebook.

The codes generated in the study, however changed many times during the initial and supplementary stages due to constant comparative method, the codes were evolved; they were tried to be kept in long (self-expressive) form, before a rigid definition and description of the code is reached, and the codes were kept in both languages 'Turkish' and 'English'; the need to do so was obvious, first the data were in

Turkish, and second, the expert teacher assistant (peer) in coding and coding check did not understand English.

Later, after completing the codings and cross checks, the codes were purified. The list of codes is shown in Table 3.2, below; there were 99 codes and used 533 times, the overall frequency of the codes together with interviewee analysis was 867 (the numbers as changing dynamic figures provided here were taken during the analysis as an instantaneous value[15]).

Table 3.2: Codebook; -PBL Codes (The big italics indicate the codes generated at the special add-on interviews).

Generated Major Categories	**Derived/Focused codes**	Coded sections of all documents
	"PBL's Beneficial Applicability"	0
	Ph_2 Analysis (Supplementary_Codes-"PBL adaptation")	0
Risky Positions	PBL is dangerous if not impl. correctly	7
	The risk: Org. left to their own	12
"PBL's Beneficial Applicability"	PBL Appl./Implementation Problems	0
	Recommend.s for TR's Adapt. to PBL	0
	Reflections of Research	0
	PBL's ADAP.PROBL.: Unknowns/Contr. Iv2	0
	Defence Industry Sector (Pub.& Priv.)	0
	USER-"TAF"	1
	Administrator (SSM)	5
Administrator (SSM)	Initiatives	0
Assign Univ.: Edu./Scient. Support	Thesis in organizations	2
	Education	14
Caveat on HR (ENGINEERS AND SYSTEM MANAGERS)	*HIRING COMPETENT PERSONNEL*	1
Choose COMPETENT COMMERCIAL AGENCIES	Caveat on Choosing PBL agencies	2
Collaboration	GOCO in PBL contracts	1
Collaboration technics- gain	IPTs	0
Collaboration/Partnership is a must	Military-Civilian Collaboration	8
	Collaboration technics- gain	3
Decisiveness, Exp.& Huge Background	University support is a must	5
Defence Industry Sector (Pub.& Priv.)	Organics: Oper.-Sustainm. Supporter	0
	Private& Foundations-Manufacturing Sector	0

[15] The distribution of codes (in last notice on the counters of the tool) to interview stages are; 276 for initial, 388 for supplementary, and 194 for special add-on interviews. The distribution of the codes to the stakeholders are; 109 to user, 135 to organics, 160 to private, 86 to foreign private companies, 90 to academia, 190 to administrator, 51 to individuals ("double sector"), 181 to nominees out of total number 1002 attribution.

Table 3.2 (Continued): Codebook; -PBL Codes (The big italics indicate the codes generated at the special add-on interviews).

Generated Major Categories	**Derived/Focused codes**	Coded sections of all documents
Deliberate ENGINEERING QUALITY & MANAGEMENT COMPETENCY	Caveat on *HR (ENGINEERS AND SYSTEM MANAGERS)*	1
Difficulties, Demoded	Deficiencies, underdevelopment, backwardness	6
	Image and rumors	6
IF PBL WERE AVOIDABLE FOR TURKEY	*MILITARY ORGANIZATIONS, NEED TO OUTSOURCE SERVICES LIKE LOGISTICS*	1
Image and rumors	Close or transfer	1
	Privatization	1
Initiatives	PBL Adaptation Initiation	10
	Re-Structuring of Organics Initiation	3
in-vivo codes	I work your questions	1
	very correct topics	1
	I want to see it	1
	will be very useful	1
IPTs	I don't know IPT	2
Mil. org.s need to be comp. enough to plan, acq.&mng. such service	*Choose COMPETENT COMMERCIAL AGENCIES*	1
	Deliberate ENGINEERING QUALITY & MANAGEMENT COMPETENCY	1
Mil. Org.s need to outsource services like logistics	Mil. org.s need to be comp. enough to pl, acq.&mng such service	1
Military-Civilian Collaboration	Mil.-Civ. cooper, is old	1
	Collaboration	25
New_1: LOGISTICS FROM THE MILITARY ASPECT	*IF PBL WERE AVOIDABLE FOR TURKEY*	3
New_2: NOTES TYPE CODES (To be reported/ignored)	Stunning cooperation prop	1
	Stunning PBL proposal	1
Organics: Oper.-Sustainm. Supporter	Difficulties, Demoded	0
	Plusses	0
	Mission & Responsibilities	12
PBL Adaptation Initiation	PDL's history	15
PBL Appl./Implementation Problems	Lack of Scientific Support	2
	Retarders	3
	Distractors)	4
	Obstacles	3
PBL is not easy! Check USA	Decisiveness, Exp.& Huge Background	2
	F-35 is organic in USA	1
	Collaboration/Partnership is a must	3
PBL model for TR	Local manufacturers are PBL	2
	Current PBL implementation model!	1
	When user is TAF	1

Table 3.2 (Continued): Codebook; -PBL Codes (The big italics indicate the codes generated at the special add-on interviews).

Generated Major Categories	**Derived/Focused codes**	Coded sections of all documents
PBL's ADAP.PROBL.: Unknowns/Contr. Iv2	PBL model for TR	50
	Risky Positions	0
	PBL definition	25
	The Statuses of Organics & Privates	7
	The statuses of Organics in PBL	11
Ph_2 Analysis (Supplementary Codes-"PBL adaptation")	NOTES TYPE CODES (To be reported/ignored)	0
Plusses	New DLM capabilities	4
	Internalized collaboration	2
	Prime supporter of weapon systems	7
	Indispensable Trust	11
Positionings of org.& priv. in PBL	STRATEGIC PARTNER	1
Prep. for Adapt: Trans. Period Req.	Preparations needed	3
	Build Awareness-Climate-Culture	23
	Assign Univ.: Edu./ Scient. Support	7
	Define Trans. Period/ Road Map	4
	Theor./Concept. Mainframe	2
	Resolve Perceptional differences	8
	Build Synergy to go from easy to difficult	2
	Statuses and legislative arrangements	36
Private& Foundations-Manufacturing Sector	Plusses	6
	Difficulties	7
	Vision & Expectations	11
Recommend.s for TR's Adapt. to PBL	Prep. for Adapt: Trans. Period Req.	0
	PBL is not easy! Check USA	2
	Re-define PBL: Benef. Applicab.	2
	Wish: TR benefits	4
Re-define PBL: Benef. Applicab.	Define PBL application	7
	PBL Definition	3
	redefinition of organics in PBL concept	2
Reflections of Research	in-vivo codes	0
Statuses and legislative arrangements	Local firms in PBL	1
	Foundations in PBL	2
	Indispensability of organics	3
	Positionings of org.& priv. in PBL	1
	Title 10	12
	Criticality	6
	Double headed acquisition	1
	PPP	6
The statuses of Organics in PBL	Foreign systems must be in Organics	4
USER-"TAF"	Other factors	5
	LOGISTICS FROM THE MILITARY ASPECT	1

The coding was continued till reaching a saturation in the theoretical samplings, or with other saying when a saturation in description of the categories that were defined in the initial analysis reached; the time when the saturation is reached is felt by the researcher during the analysis, however it is checked by reviewing all the remaining data sets by critically reading. The saturation was reached in 12th data set; although the analysis of the remaining four sets continued, there was not any newly emerged tentative theoretical category.

In third step, since it is a part of 'The constructivist GT process (Adapted from Charmaz, 2014:18)' (Figures 16 and 17); as a requirement of constant comparative method although there was not any need to generate new theoretical samplings, the existing theoretical samplings were re-processed to polish and make them more obvious and robust with the help of additional data and their comparisons. This part is dependent on the researcher's very own capability to interpret the very first findings of the analysis.

According to Charmaz (2006) there was three ways to depict the categories/concepts in one place; messy codes, mapping, and diagram; the diagram method is chosen by the researcher, as it is found more descriptive and more creative to see all the interlinkages among the categories and sub categories or belongings of that category. The effort took many stages till reach its definitive version that is shown and described in the following sections of this study; The figures for the two intermediate stages of the diagramming process are shown in Figures 3.4 and 3.5 on following pages, respectively.

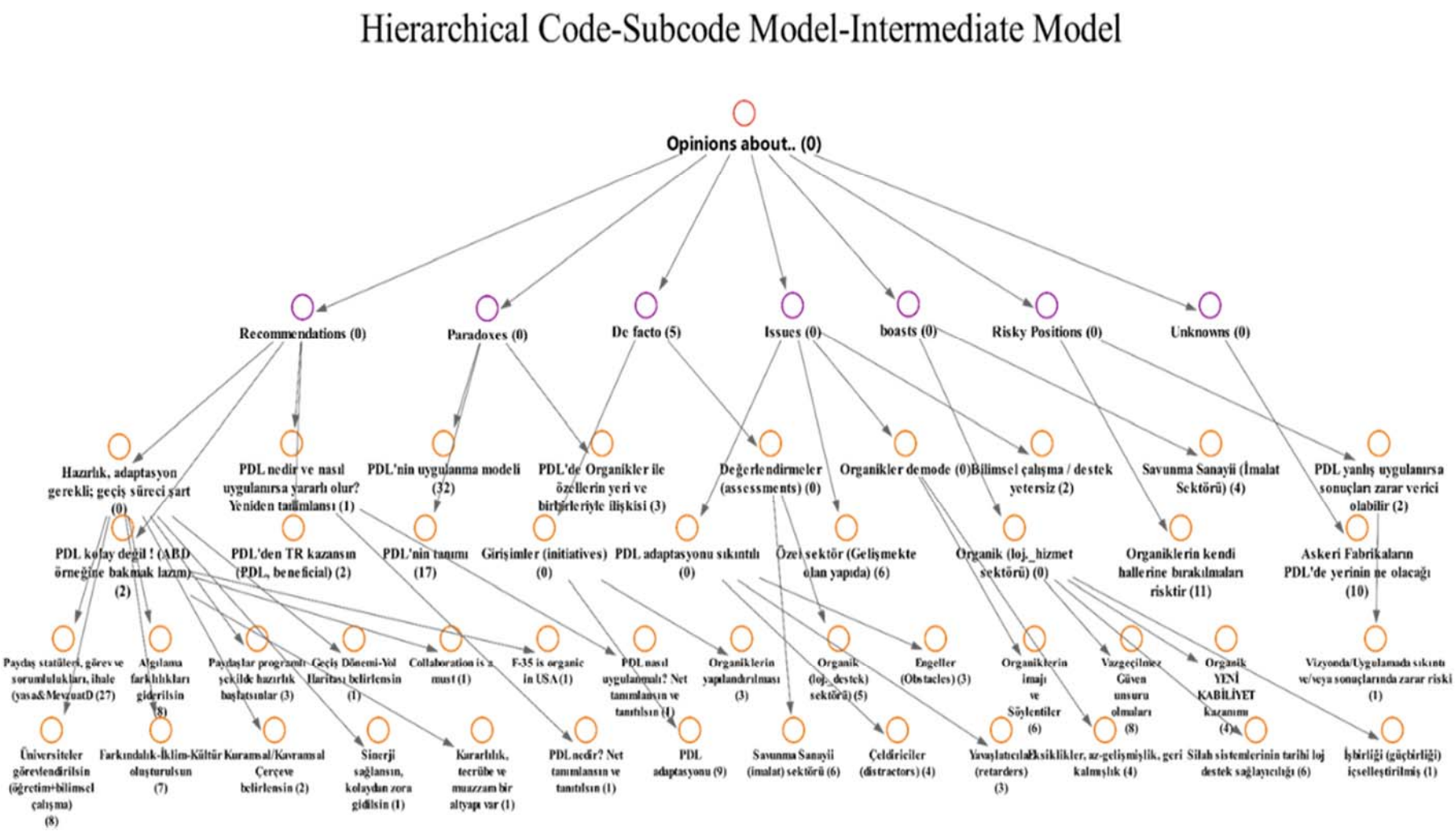

Figure 3.4: One of the earliest forms of theoretical categories (In Turkish and in English).

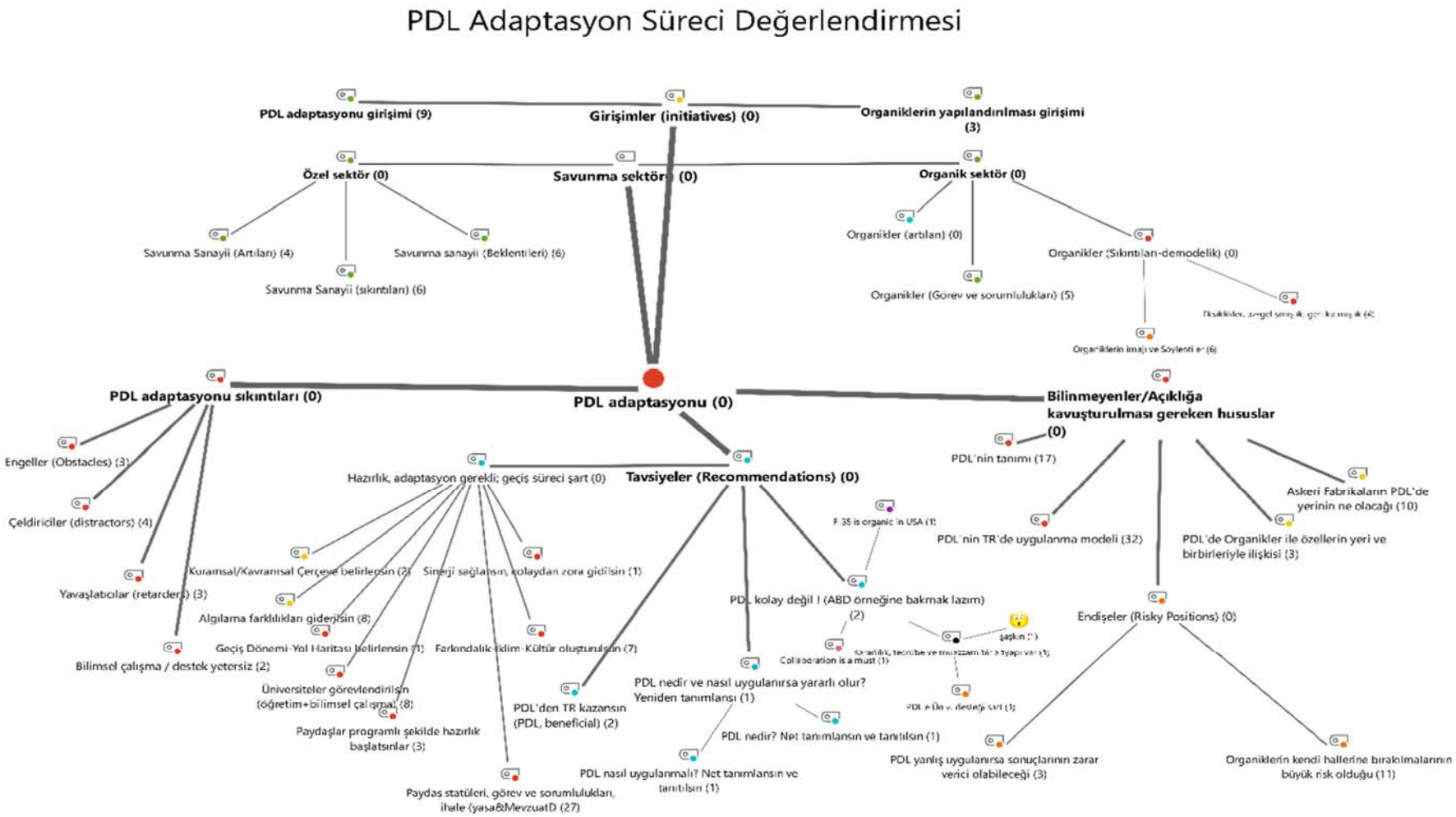

Figure 3.5: One of the intermediate forms of theoretical categories, close to the final 'The PBL Adaptation Process Evaluation' (PDL Adaptasyon Süreci Değerlendirmesi).

As the figure depicts the situation, the theoretical concept is not mature yet, and the subcategories are messy. The CAQDAS tool (MaxQDA) is very convenient on playing with this kind of messy diagrams to depict the memos in the way to explore the grounded theory, and later the diagram took the following shape (See Figure 3.6) on next page; it is now more explanatory. Notice that, the data collection and analysis has been carried out bilingually, this graphic is intentionally presented in its original Turkish/English version of the study progress, to denote the situation.

The mainframe generated by using GTM on initial interview data is modified during the analysis of supplementary interview data: It is noted that, the generation of some new codes such as 'THE USER', and ' LOGISTICS FROM THE MILITARY ASPECT' etc. that were used by the participants, helped the gap that was preventing a robust theory generation; a lack of something to complete the whole picture in this diagram:. The codes, hence concepts derived in analysis of the supplementary data made this happen, hence the Figure 3.5 on following page (after Figure 3.4) does not have the user concept in itself, reached a more robust competency in understanding of the PBL adoption process; it is presented in following section. These all were noted in the memos held during the analysis by using the MaxQDA, in that respect, writing the reports also much more easier with it, however, in this study for several reasons, the researcher has switched from one to the other and used both languages as which one is needed at that moment more, that lowered this convenience in that context. The 'codebook' generated automatically at the end of the analysis provides this convenience in an orderly format by generating from the memos written by the researcher during the analysis; therefore, it provides a foolproof writing/reporting tool at the same time (All the reported items can be followed to the specific details in the analysis.).

The next section will follow with the final diagram, the depiction of the analysis of interview data, and the findings.

3.2 Findings

The resultant diagram of the GT approach is a tool of comprehensive and inclusive understanding of the analysis findings and the grounded theory of the research's aim; it is presented in the Figure 3.6, on next page.

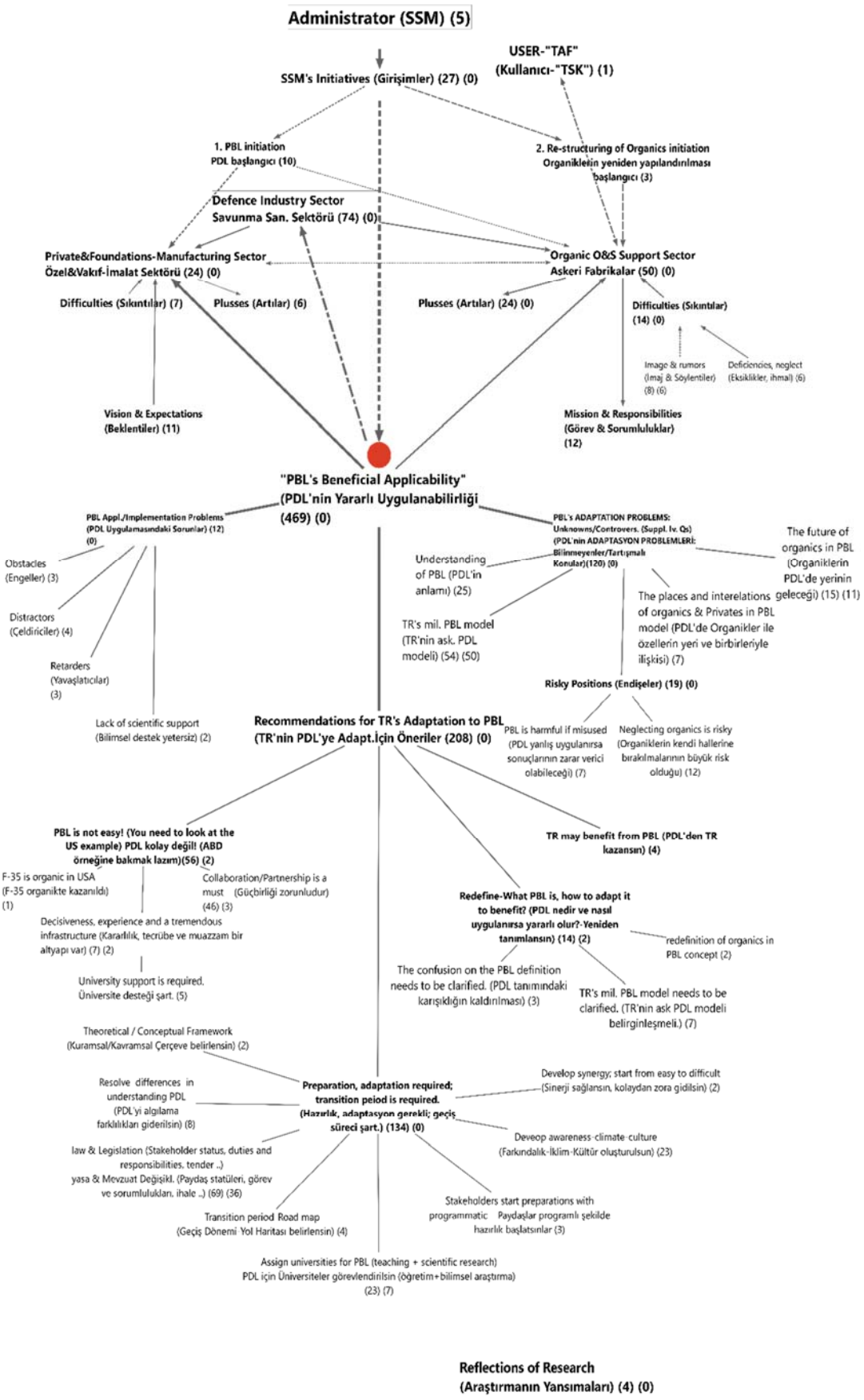

Figure 3.6: Tree Diagram of the PBL application: The implicit key points of PBL's beneficial and sustainable application.

In this research study the aim was to explore the grounded theoretical proposition(s) of the PBL applications/implementations in aerospace and defence systems through applying constructivist GT approach defined by Charmaz (2006) on the data collected from the authorities or skillfully experts chosen purposefully to represent the stakeholders of military logistics in aerospace and defence systems.

Upon completion of the analysis, the findings were visually represented in the diagram, as it is well depicted there the existing situation, the obstacles and the key points of a beneficial and sustainable PBL application and relevant recommendations; in an inclusive context with all the interrelations of the revealed concepts are mapped there, the explanations are covered in the memos. That diagram will be used to describe the theoretical propositions with an understanding of the situation and rationales.

The found tree diagram details are explained in the table below (Table 3.3).

Table 3.3: Summary table of major categories with relation to data/codes/categories.

In order to	Constantly compare	Findings
develop codes	1) pieces by pieces of data (data by data) 2) data by codes	1) 866 codings in three stages of interview data, out of 159 different codes[16]; these codes are belonging to 51 subcategories/ sub-subcategories
raise significant codes to tentative categories	1) codes by codes, 2) codes by categories, 3) categories by tentative categories	Throughout the analysis, there have been numerous (dynamic/not counted) tentative categories, at the final position 7 major categories generated which are listed in the cell below.
Treat major category(ies) as a concept(s)	1) data/codes/categories by tentative categories	Six major categories (concepts): *I. Noting the aim;* 1. Administrator's initiations *II. Noting the situation of sectors;* 2. Manufacturing sector's status: 3. Organic sector's status: *III. Noting the PBL application problems;* 4. Application/implementation problems 5. Adaptation problems 6. Adoption problems (Recommendations)
Theoretical category/concept	1) Concept by concept (+The Derived Concept with Disciplinary Concept)	Theoretical category (concept) 1) "PBL's beneficial* applicability" Note: ('and sustainable') added later.

The essential condition of the GTM is using the constant comparative method. The constant comparative method is applied throughout the GTM analysis; the

[16] The distribution of codes to interview transcripts are; 276 for initial, 388 for supplementary, and 194 for special add-on interviews. (Note that, the numbers are taken from the Maxqda tool; the researcher is aware of the total of groups makes 858, while the reported number of codes is 866, the reason is being searched; Project file: ProjeT(Last_worked)V KISA RP.mx18, in Researcher's computer: file:///C:\Users\Veli\Desktop\SON ANALİZLER\EN_SON VISUALS\).

comparisons were held between data by data, data bay code, code by code, code by tentative category(ies), between categories, between data/codes/categories/tentative categories/theoretical category (category is synonymous with concept). These analytic comparisons were done constantly, during all the steps of analysis; the resultant findings are summarized in Table 3.3; in this analogy. The table's left two columns are derived from the descriptions provided by Charmaz (2006:82; 2011:261).

These six major categories, and one theoretical category that is obvious in Figure-24 above, are also seen in the diagram on the Figure 3.5, above, which was one of the earliest version of latest form of Figure 3.6.

Six major and one theoretical categories (concepts) of that table correspond to the delineations that are noted in Figures 3.6 and 3.5; they all are examined here under five headings:

The findings of the GTM study:

1. The Moderator's PBL initiation and the defense sector's status (covering mentioned major categories of 1, 2, and 3 of Table 3.3),
2. The PBL implementation problems (major category number 4),
3. PBL adaptation problems (major category number 5),
4. Recommendations (major category number 6; adoption problems),
5. The proposition(s) on the *'PBL's beneficial and sustainable applicability*'

The visional depictions of the findings are given in pie-chart graphics with frequencies of attributions. The neither frequencies nor the percentages are important as Charmaz discusses in her book (2006), therefore the attributions are only the figures representing the coded data; numbers may change as there are still data that are not coded because the codings were ceased when the saturation is reached in theoretical samplings.

General look to the findings:

The Main Insights About the Data and Findings: The data gathered during the initial interviews by the selected members/ex-members of the stakeholders were used to analyze the PBL applications/ initiation. Starting from the earliest interview and the following ones, the research data was pointing problems, controversies, and

suggestions of military logistics representatives based on their perceptions[17] about the PBL applications.

The most frequently attributed codes are seen in the first row in Figure 3.4 (which are raised to categories as the PBL subtopics of PBL issue of Turkey) just after the first phase of interviews are seen in Figure 3.7 below. As it is seen in the figure, they are 'recommendations', 'paradoxes', 'issues', 'risky positions', 'emerging questions', and 'boosts' in the order of the attributions made in the first phase of interviews, the last category is about the determination of the 'De-Facto' situation.

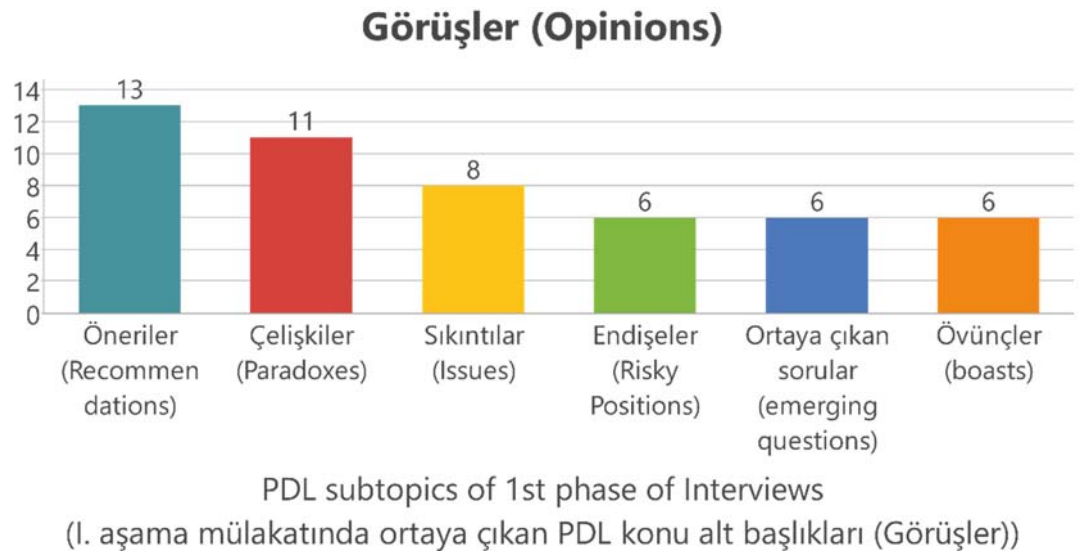

Figure 3.7: PBL subtopics revealed after Iv1.

The Figure 3.8 below shows the changes in this situation after completing the supplementary interview (Figure 3.6; middle right sector); most frequently referred topics in the interviews are re-collected under major category of 'PBL's ADAPTATION PROBLEMS'.

[17] Frost & Sullivan, (2009:13) states that the PBL perceptions might and will be different around the world.

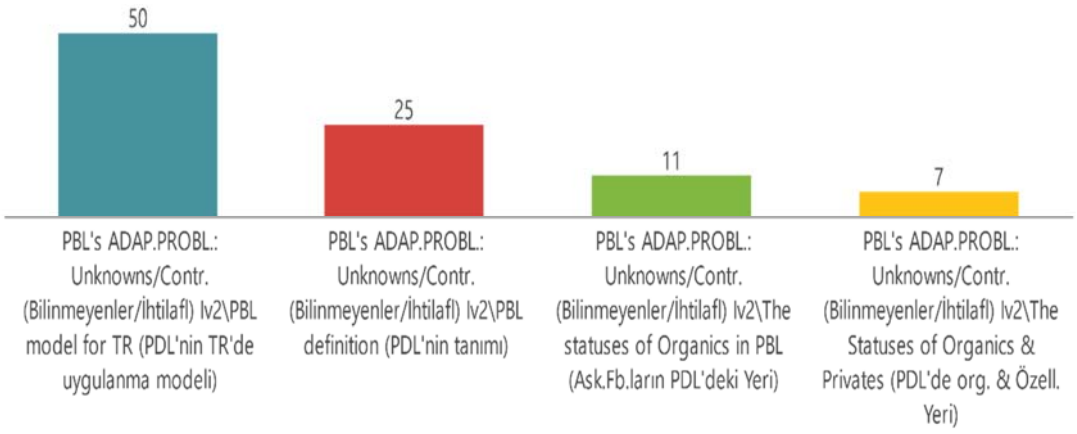

Figure 3.8: Most frequently referred topics in the interviews.

As it is seen in the Figure 3.8, the 'PBL's ADAPTATION PROBLEMS: Unknowns/ controversies') major category sub-codes (hence the raised categories) are actually denote four main PBL subtopics as 1. 'PBL model of TR', 2. 'Definition of PBL' (for Turkey), 3. 'The statuses of organics in PBL', and 4. 'The statuses of organics and privates in PBL'. Note that an additional sub-topic 'Risky Positions' is seen in Figure 3.6 under the same category[18].

Both figures (Figure 3.4 and 3.6) as the evidences of this process will be delineated in following sections. Before going further into the delineations of the findings, two findings will be noted; The one of the note effective findings was the complexity and therefore the risky position of PBL applications, and the second was the importance of this study with its aim, they are noted first.

The PBL Is Un Avoidable: Quitting the PBL adaptation initiations would not be a solution either, as it was pointed out by I38, logistics services were ought to be outsourced, and I57, I85, I87 it was un avoidable if a country has participated in an international defence systems development project (e.g., F-35, A-400M, Airborne Warning and Control Systems (AWACS) etc.).

Reflections About the Study: I40 points out that (Figure 3.9 below), this study covers the issues that some experts are currently studying on; the correct topics to study, and the results will be wondered.

[18] The Figure 3.8 is an automatically generated graphic; where since the 'risky positions' subcategory has two subcategory its codes frequency is not detected by the tool; hence it did not take place in Figure 3.8.

Figure 3.9: Reflections of the study.

3.2.1 The PBL (Initiation) Applications and The Defense Sector's Status

The PBL as a strategy, is initiated by government (I46, I 78) in 2012, after the law-3738 enacted; and the first time in the history, the maintenance function partly was given to the local industry; it was the mission of the organics till then.

The interview data shows that, the PBL initiative has created some complications in the opinions of the interviewees[19], and existence of another concurrent initiation (I97), might have had a detrimental effect on the PBL problems. The complications mentioned in the interviewee opinions are shown in Table 3.4 below.

Table 3.4: The resultant complications of PBL according to the interview data.

Complication	N	Definition of complication
Problems in PBL applications/ Implementations	1.	Obstacles
	2.	Distractors
	3.	Retarders
	4.	Lack of scientific support in PBL applications
Problems about the PBL's Adaptation	1.	PBL definition
	2.	PBL model for TR
	3.	The statuses of Organics in PBL
	4.	PBL is dangerous if not impl. correctly
	5.	The risk: Org. left to their own
	6.	The Statuses of Organics & Privates
	7.	Foreign systems must be in Organics

[19] The PBL strategy in a country can only be put into execution by government, the government agencies define and apply the policies, having these problems imply that the policies need to be revised.

Table 3.4 data are the extractions of the 'PBL Appl./Implementation Problems' and 'PBL's ADAP.PROBL.: Unknowns/Contr. Iv2' categories which are delineated in the following sections.

The problems revealed in this research about the 'PBL applications/ Implementations' are 'Obstacles', 'Distractors', 'Retarders', and 'Lack of scientific support in PBL applications'.

On the other hand, the problems about the 'PBL's Adaptation' are 'PBL definition', 'PBL model for TR', 'the statuses of Organics in PBL', 'PBL is dangerous if not implemented correctly', 'the risk: Org. left to their own', 'The Statuses of Organics & Privates', and 'Foreign systems must be in Organics'.

'Manufacturing sector':

The opinions (Figure 3.10 below) expressed on the vision of privates are one of the most frequently attributed topics, the opinions are 'expressions of pride' (I52, I 68 et al.), the difficulties are about 'their being in learning phase'; 'being not ready to take responsibility in logistics' (I 46, I 67), 'need to stay afloat and profit seeking' (II45). The plusses are attributed by 'their performance on the existing contracts including some logistics support' (I78, I36).

The manufacturing sector of defence is in a good performance in designing and manufacturing, as well as in cooperating with international defence companies (I68, I95 et al.), they have to take responsibility in logistics support too, but in a co-operation with organics (I95), the enhancement of private sector in logistic support will also provide a privilege to them in competition in world also (I58), however; private should be limited to national privates only in PBL (I58), additionally the sector is not mature yet (I27), there may be some tendency in privates as 'to look to the PBL from profit wise only', they have to look to PBL as a permanent income (I58), there are new initiations to establish new institutions on issues such as economical/legal/security, on the other hand SMEs are still young, and the manufacturing is definitely the privates' responsibility, however the logistic support needs to be planned very carefully including all the capabilities of the country (I67).

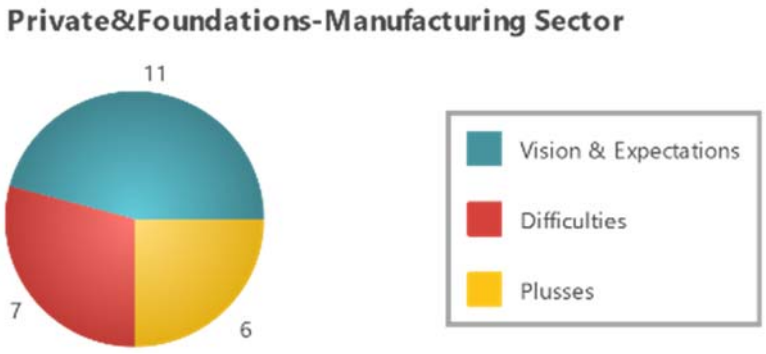

Figure 3.10: The manufacturing industry.

'Plusses of organics':

'Being the prime supporter of weapon systems' (I32, I46 et al.), 'Internalized collaboration' (I 95, I45), 'New DLM capabilities' (I32, I52, I67), and 'Indispensable Trust' (I67, I45, I46) are the plusses of the organics (Figure 3.11 below).

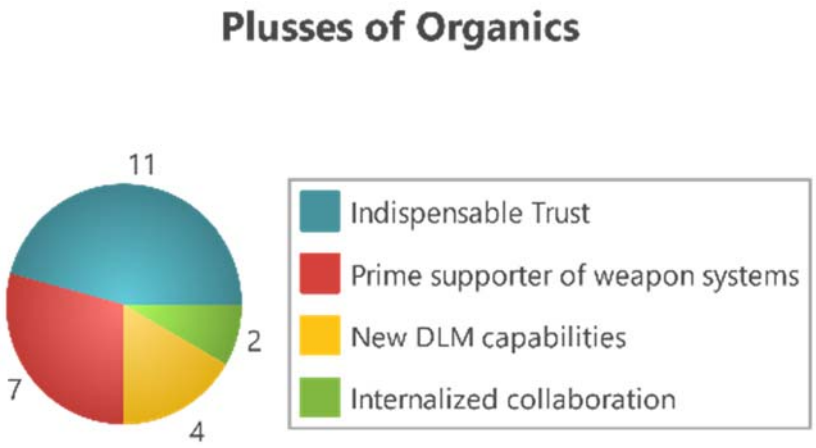

Figure 3.11: Plusses of organics.

'The problems of organics':

The attributed problems of organics as seen from Figure 3.12 (below) were 'Image and rumors' (I36, I32), 'Close or transfer' (I58), 'Privatization' (I47).

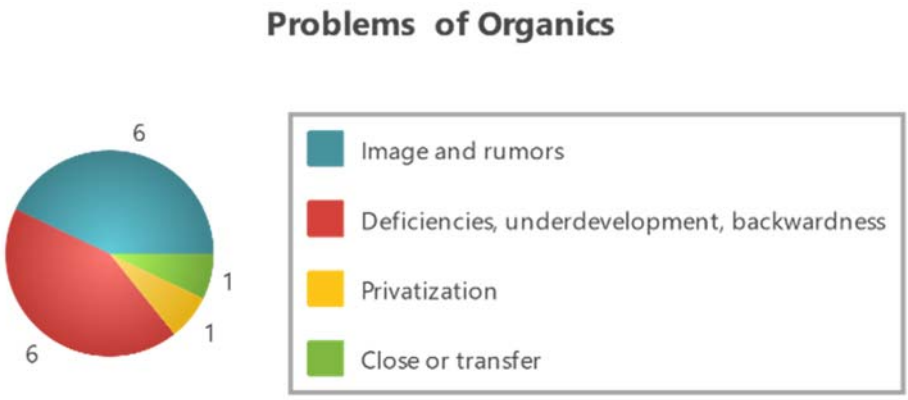

Figure 3.12: The problems of organics.

'PBL's beneficial and sustainable applicability', as the wanted grounded theory; an attempt can be made here by the help of the memos developed during the analysis. It is, as the two major categories that imply main complications mentioned at the entrance of this section, namely ' Problems in PBL applications/ Implementations', and ' Problems about the PBL's Adaptation' are considered in place with military logistics sector's current status, all are supporting one of the theoretical propositions that *'The organics need to be taken into the PBL coverage as the main role player, that will enhance the solving PBL application/implementation and adaptation problems which are naturally service dominant, and organics have the outmost experience on logistics services in military logistics. At the same time 'The risk: Org. left to their own' would be taken care, and the synergistic effect would beneficial to both."*

3.2.2 The PBL Implementation Problems

The implementation/application problems (Figure 3.13 below) that were mentioned in the interviews are characterized in four aspects; First, 'Obstacles such as PBL's metrics for describing and measurement' (I32), 'serial number track problem' (I52), and 'legislative regulations' (I68). Second is 'Distractors'; 'Decisiveness' (I36) and 'being accurate choosier' (I68) 'needed from higher echelons' (I36), 'Organics is still at an awaiting position', and 'they need to be GOCO (Government-Owned, Commercially-Operated)' (I31). Third, 'Retarders such as unavailability of the possibility to utilize the organics by private third party' (I67), and fourth is 'Lack of

Scientific Support such as still there is not a doctoral study in PBL'[20], 'not the sedulousness but being objective is important' (I36).

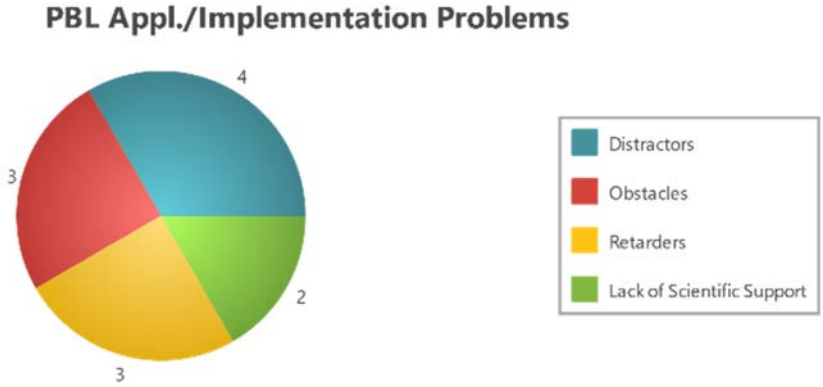

Figure 3.13: PBL application/Implementation problems.

'Risky positions faced by organics':

The first risky position (Figure 3.14) is about 'PBL is dangerous if not implementation correctly'; in this context the risks are expressed as; for economical/political/Sociocultural/strategical perspectives (I68), there are studies in USA showing it could be expensive applying PBL strategy (I27), security wise (I45), seeking savings may danger quality (I50), analyses must be done carefully before arranging a PBL (I52.

Figure 3.14: Risky positions faced by organics.

The second risk position is denoted by 'The risk: Organics left to their own' is delineated as 'legislation bottlenecks they face' (I27), 'working capital bottlenecks' (I67), and 'if they are not strengthened in required aspects, they will diminish' (I50).

[20] The date of the interview was 2016, but before Özdemir's (2016) study.

'PBL model in participants' perceptions':

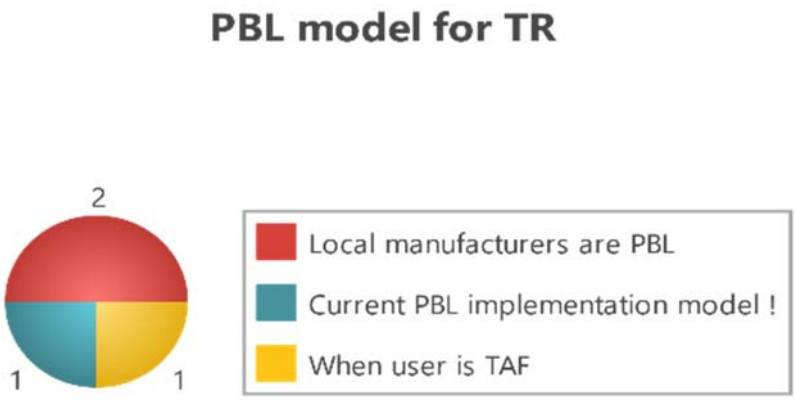

Figure 3.15: PBL model in participants perceptions.

The PBL model is sought by the interviewees are seen in Figure 3.15 below.

The PBL application models were mentioned as 'the proper model' for the country. In the delineated models (I36): 'the contractor was the own manufacturer of the system for local systems', and 'the contractor was organics for the foreign made systems'. In delineation, another proposal was 'the operation of the organics by the local firms (GOCO)'. Another interviewee (I89) on the other hand was proposing that 'the compliance of the existing legislations is adequate, chief of staff in TAF, can issue an order indicating (starting from) which systems will be supported by PBL strategy; the only requirement is 'the wish' together with financial source'. Another interviewee states 'the importance of the armed forces in logistics support and emphasizing the necessity for the logistic support to be fully competent and fully warranted' (I89).

3.2.3 PBL Adaptation Problems

'PBL adaptation problems' as perceived by interviewees are concentrating on five categories; 'PBL definition', 'the risky positions', 'PBL model for TR', 'the statuses of Organics in PBL', and 'The Statuses of Organics & Privates'.

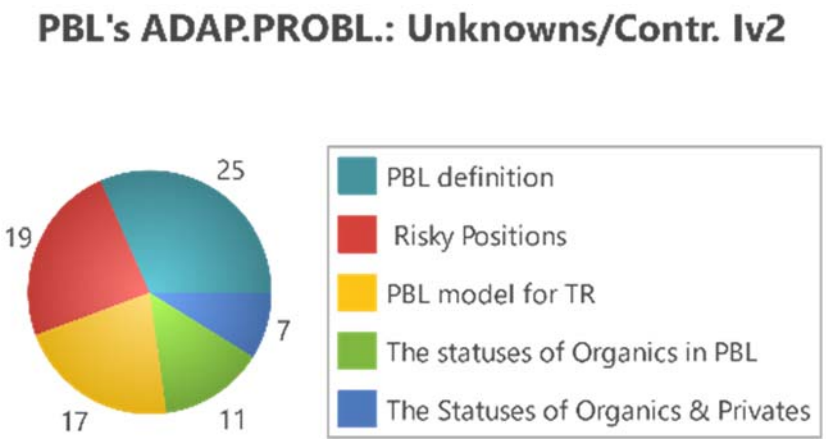

Figure 3.16: PBL Adaptation problems faced.

Those sub categories are depicted in Figure 3.16 below, the attribution frequencies also noted in pie chart diagram.

That classification is based on the frequencies of the major categories; however, some categories have their own subcategories, and those subcategories have also quite a large number of attributions; the analysis of those sub categories were deemed useful in this examination, that is explicitly explained in Figure 3.17 on next page.

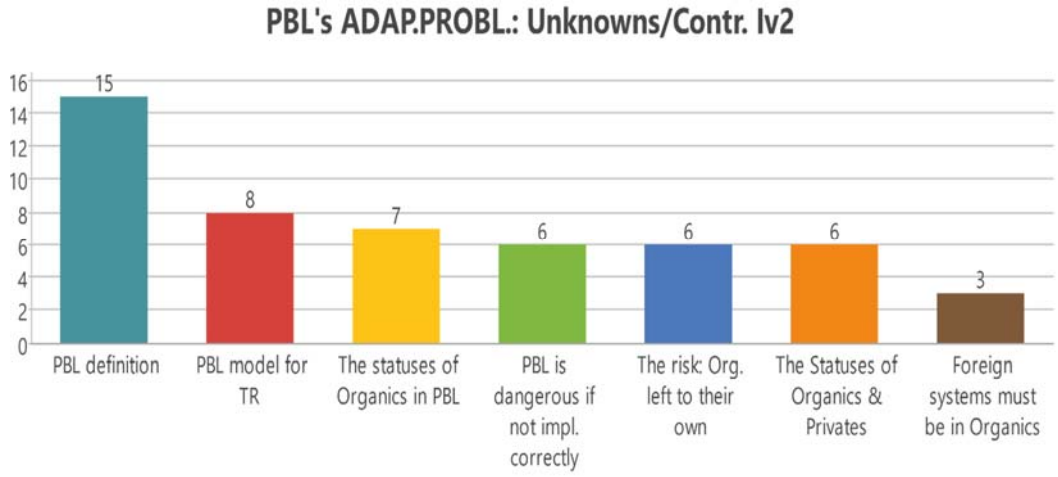

Figure 3.17: PBL's ADAP PROBL.: Unknowns/Contr. Iv2.

Figure 3.17 above depicts the seven categories underneath of PBL's Adaptation Problems: Unknowns/Controversies Iv2 ('PBL's ADAP.PROBL.: Unknowns/Contr. Iv2') category as; 'PBL definition', 'PBL model for TR', 'the statuses of Organics in PBL', and 'The Statuses of Organics & Privates'. That classification is based on the frequencies, when carefully examined, the risky positions can be opened to reveal the

sub category of 'the risky positions'; that are 'PBL is dangerous if not implemented correctly', 'The risk: Org. left to their own', and 'Foreign systems must be in Organics, besides 'The statuses of Organics in PBL' reveals one more category of 'Foreign systems must be in Organics'; in total seven categories are reached.

The attributions to some of these categories are depicted below;

'PBL definition' Category:

'PBL definition' 15 participants, 25 times, and delineates PBL as;

1) cost reduction (I36)
2) not a privatization (I52),
3) but sharing of logistic support between public and private with seeking cost (I52)
4) a model of managing the logistic support (I68)
5) not a SCM only (I68)
6) it is furthermore; repair, engineering and technical support, configuration control, even making minor changes/operations (in emergencies) (I68),
7) it looks preferable in long term in cost base studies (I89)
8) it is the union of the military forces with industry (I89)
9) Simulator support service agreements are kind of it (PBL) (I78),
10) it is a strategy needed to be defined precisely in all details (making a long delineation) (I67)
11) firefighting aircraft, ambulance aircraft can be arranged as PBL, defence systems are different (I67)
12) Military forces need to return to their core functions (I67)
13) it might even more expensive (studies in USA), not so perfect like a magical formula (I27)
14) let's not to jump on it (Referring SSM's opinion here), there are various degrees of it (I27)
15) Full PBL is expensive (I27)
16) it should be disseminated to both local manufactured systems and to the projects that are aimed to be localized (I 58)

10 more attributions exist for this code, and several for the others.

3.2.4 Recommendations (Adoption Problems)

This category collected the recommendations of the logistics authorities to adapt the inner resources to raise a systematic infrastructure to support the PBL strategy in beneficial and sustainable manner (Figure 3.18, below).

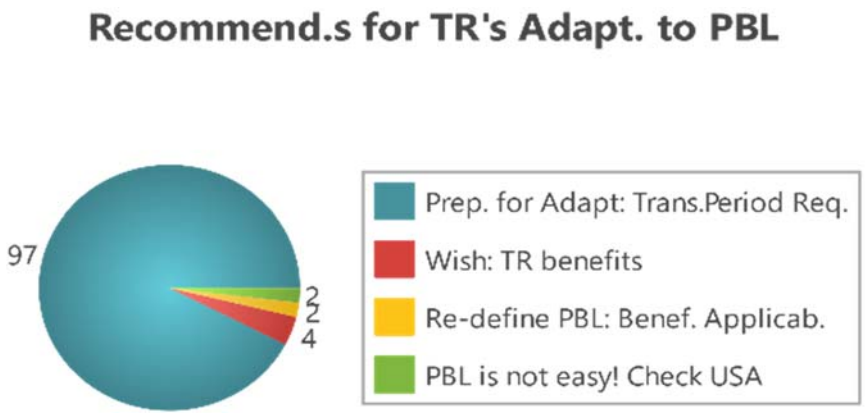

Figure 3.18: Recommendations of participants (Adoption Problems).

They are knowledge generating and disseminating type measures, which are the most important entity of the PBL's three support legs. The category consists of four sub categories as; 'PBL is not easy! Check USA', 'Prep. for Adapt: Trans. Period Req.', 'Redefine PBL: Beneficially Applicability',.and 'Wish: Country benefits', the suggestions are grouped in Table 3.5 below.

Table 3.5: Recommendations of participants (Adoption Problems).

Complication	N	Definition of complication
PBL is not easy	1	F-35 is organic in USA (F-35 engine capability is achieved.
	2	Decisiveness, experience, and a tremendous infrastructure
	3	University support is required
	4	Collaboration or partnership is a must
Preparation, adaptation required; transition period is required.	1	Theoretical/Conceptual Framework
	2	Resolve differences in understanding PDL
	3	law & Legislation (Stakeholder status, duties and responsibilities, tender...)
	4	Transition period-Road map
	5	Assign universities for PBL (teaching + scientific research)
	6	Stakeholders start preparations with programmatic
	7	Develop awareness-climate-culture
	8	Develop synergy; start from easy to difficult

Table 3.5 (Continued): Recommendations of participants (Adoption Problems).

Complication	N	Definition of complication
Redefine-What PBL is, how to adapt it to benefit?	1	The confusion on the PBL definition needs to be clarified.
	2	TR's mil. PBL model needs to be clarified.
	3	redefinition of organics in PBL concept
PBL is unavoidable, but however it requires certain conditions to benefit from PBL		

The recommendations expressed by the interviewees against the expressed complications are noticed in this category.

Note that all the recommendations are seen to be inspired from US PBL applications/implementations; this is due to 1. PBL is emerged in USA, 2. The interviewees had experienced PBL in USA, or have taken education about the PBL in USA.

3.2.5 The Development of Propositions

The need to clear the hurdle on beneficial and sustainable PBL applications as aimed in this study a theory proposal including the propositions are generated from the findings.

The theoretical propositions need to cover the following key points as revealed by GTM analysis of the interviewees' opinions:

1. The PBL is unavoidable, but it can be applied, and it can be useful.
2. The PBL definition and beneficially applicable model for aerospace and defence systems need to be redefined; all the measures depicted in Figure 3.18 above need to be developed and applied. (The boundaries of maintenance/organics, and the manufacturing sectors need to be drawn carefully, the statuses need to be protected; the criticality factor should be defined; the coordination and strategic partnerships instead of competition among the national entities need to be provided and protected.)
3. Scientific support requirement both for research and educational purposes is necessary.
4. After adaptation issues resolved, the implementations (to Forces) and applications in those relevant systems can be started; but from easy to hard.
5. PBL adaptation, implementations, and applications all need to be watched carefully, and the development of PBL needs to be supported scientifically, contract wise and progress/regulations wise.

6. Applicable and acceptable to key stakeholders.

7. The security issues of the contractor should be controlled and manageable (two-way knowledge communication, the Armed Forces trust warranty are important, the integration is necessary).

8. It should not be seen only DLM, but engineering, quality, configuration, contract management are important.

9. Strike, lock-out/shot-out, bankruptcy/failure are needed to be considered, and continuation of the support at all conditions (tension, war etc.).

The Grounded theory:

The Grounded theory then in this study for PBL's beneficial and sustainable applicability in the maintenance of aerospace and defence systems in that context, and in terms of three theoretical propositions become;

1. The PBL is unavoidable: The PBL is unavoidable, but it can be applied, and it can be beneficial,

2. The PBL is not easy: The government needs to define, develop, use and, improve continuously the necessary measures to adapt itself to PBL, as well as to adapt, implement, apply PBL. This needs scientific research and educational support. If the adoption and adaptation is not made accordingly, the applications cannot be arranged or managed; therefore, PBL can be hazardous.

3. Risk management is necessary: 'The organics need to be taken into the PBL coverage as the key role player, that will enhance the solving PBL application/implementation and adaptation problems which are naturally service dominant, and organics have the outmost experience on logistics services in military logistics. This can be used as a leverage to control both risks of '"avoiding from hazardous PBL applications' plus at the same time 'Left the organics to their own', and the synergistic effect would beneficial to both manufacturing industry and organics.

Polishing the theory:

The theory can be defended by its propositions.

First, 'The PBL is unavoidable': The revealed grounded theory starts with an axiom; the PBL strategy is un avoidable; this is an evidence, if a country participates in an international defence system development, or if procures a modern aerospace related defence system, accept the PBL strategy for logistics support, as an unavoidable part of the acquisition, F-35, A-400M etc. are just a few examples. Hence,

the country either will follow what is proposed to her, or can discuss her logistics problems in PBL, additionally, in PBL, the global logistics centers are the main logistic centers, to be a part of that logistics chain, she needs to be knowledgeable on PBL, furthermore, the researcher has an insight that the similar business and innovational methods has to be exist in manufacturing field too; indeed it is out of this study's scope, and can be discussed in other environments. But the truth, if PBL is adapted and the country is adapted to PBL, then the benefits in and abroad can be sought, otherwise, the risks even cannot be controlled.

Second, The PBL is not easy: The beneficial and sustainable application/implementation of the PBL needs three adaptations; adaptation of the PBL concepts, adaptation of the country, and adaptation of the regulations and environment, in other words, it is based on three stands as depicted in Figure 4.1 below.

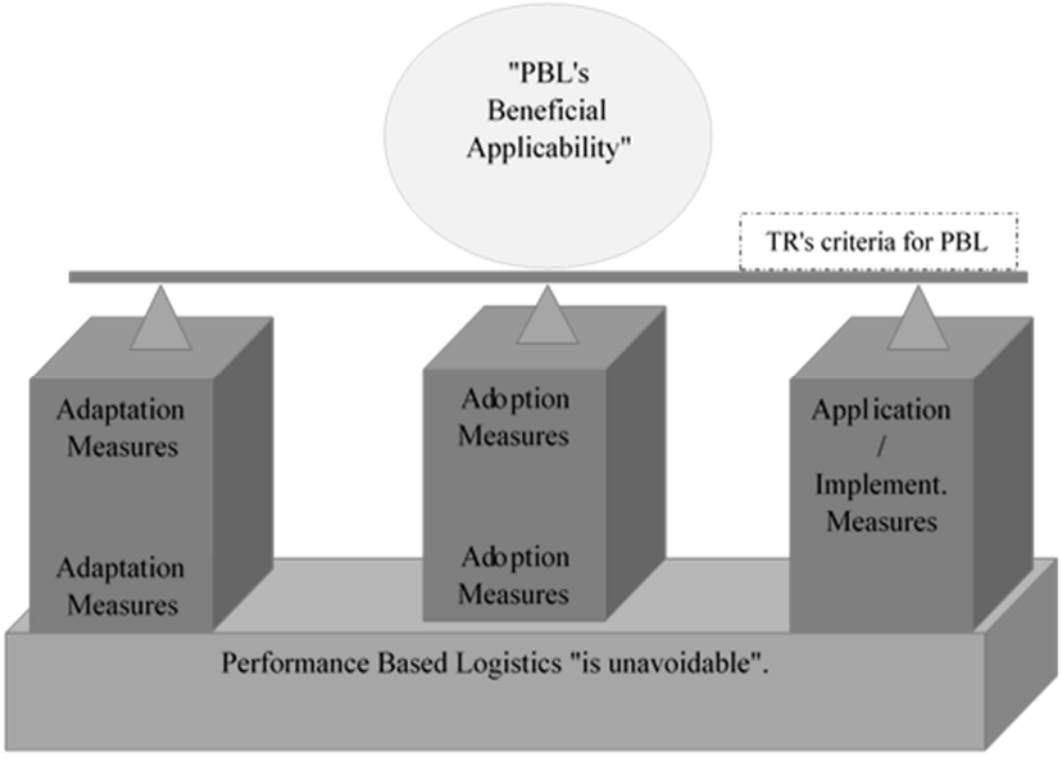

Figure 4.1: The visualization of the grounded theory of beneficial applicability of PBL.

The figure 4.1 is a visualization of the infrastructure for beneficial and sustainable PBL applications, either to arrange (plan a contract), or to manage a PBL contract. The country needs to take three major measures. Fist she needs to adjust the PBL strategy into her position, her vision on the defence, economy, industry, as well

as the politics. What would be tenets of PBL, how can it be accepted, the achievement as well as the failures on the contract, how will be measured what would be incentives and sanction, and their legislations the statuses of the system manufacturers, SME's, organics, institutions in this picture needs to be defined and preserved.

The adoption is establishing a living infrastructure that makes the knowledge required for everything in PBL including the education and certification of Human Resources that will be needed at every stage and at all stakeholders, and most importantly in the government agencies, to arrange, manage, defend PBL issues wherever they are needed in and abroad.

Application and implementation measures are focused on the individual PBL considerations, when considering a PBL contract on a component, system or platform, the availability criteria (metrics) are most important part of the long term PBL contracts, since the contract will be counted for years in the subject system's life cycle, it needed to be arranged according to these directives, baselines and guides (guidebooks); all need to be unclassified, open to general public, but the mainframe of the applications as well as the implementations, They need to be detailed enough to be applicable by the product support managers.

Third, the PBL, either as user of a PBL service (which starts automatically, by agreement of acquisition of a modern defence system from abroad), or by using PBL as a strategy in logistic support of the aerospace defence systems is risky. The risks need to be measured, weighed and managed, that requires human resources in every place and end of the contract.

The organics are the outmost experienced and knowledgeable entities of a country on military logistics. Hence, they need to be evolved in the PBL. Otherwise, the lessons learned will be urgent need at the first turn, it might be late, as the organics exhibit a problematic picture with its added problems according to the interview data. They are the most trusted and approved logistic service providers needed and successful till now, they cannot be left on themselves.

There are many arguments to be derived in that issue, however, one thing is for sure, they are needed now, and they will be needed in future too, even more than today, because using outsources (although there are arguments that PBL is not an outsource, is not a privatization...), the contract arrangement and management needs very skilled,

experience experts on the system that the contract is being done for communication for setting the criteria, for measuring, for controlling and assuring the quality.

The human resources are indispensable for all stakeholders, and the governments need to keep the best Human Resources (HR) if they are going to use the PBL as the long term (life cycle) logistic support strategy in defence systems. The government, has to have the organics, even if they had not, they should be established from zero. They should be considered as the prime logistic supporters of the country, as it was till now. They can be utilized for many purposes, such as a competitor, for cooperation, for risk control and management, as school, as the base of the logistics; right hand of the armed forces, they need to be adjusted/adapted to today's even tomorrow's conditions. As last word, they should not be left to their own, not before the US does it.

3.3 Evaluation

This section makes a comparison of the findings (as factors or as propositions) with the insights obtained from focused review of the literature. This also meets the answer to the second research question; 'How do the emerging theoretical explanation(s) compare to the original PBL applications in the country that PBL has emerged (USA)?'

The researcher's insights emerged from the review of the relevant literature that are presented in Section 1.1. and theoretical understanding of the PBL's adoption on top of it, as stated in the beginning of the Chapter 1 referring Charmaz (2006:167). This section is derived to be used to compare the findings of GTM analysis; and since the details were explained in Chapter 1, the details are omitted here both to keep the summary short, and to prevent the duplications; only un avoidable references were noted.

PBL is emerged as a solution to control the increases in the budgets[21] of defence systems' logistics support[22]. PBL was a proven solution that has been using by civilian airliners as "power by hour" concept which takes the user's responsibility on the maintenance of the transactional concept which is based on the "repair and parts". The transactional concept was accused on the supplier's abuse in the system that made high profits. The new PBL strategy was based on the availability of the system, that was shifting the responsibility from user to the service provider to organize all supplier networks, as well as bringing technological innovations on the reasons of failures in the defense equipment. Additionally, Younossi et al. (2007) suggested, to provide a wide competition; in other words, the involvement of the stakeholders against the probable reasons for cost increases. This was against to some opinions that took place in the interview data such as "we (private) do better and more economically", and supporting the findings as involving organics in PBL does not bring any cost increase.

However, PBL was not easy to apply, if not adapted properly, it was causing again to the increases in the cost, while endangering the use of the system. Therefore, a systematic background was established to educate the HRs, and to carry scientific researches. The PBL contracts was needed to be carefully examined for an arrangement of PBL, PBL contract arrangements and PBL contract managements need authorized, skillful personnel in Government. Maximizing the use of performance-based strategies were preferred and encouraged, however the transaction-based support was not taken away (US DoD Defence Acquisition University, 2018); "age of the system, existing support infrastructure, the levels of organic and commercial capabilities, legislative and regulatory constraints" were needed to be considered to choose a logistics support strategy for the defence system. Additionally, "the partnering opportunities, Title 10, service policies, OSD/Service Guidance, existing

[21] Most of the time, Public is seen as the hidden cause of increases in prices, and therefore going private sector is perceived generally as the best choice, in defense for example, a cost saving is expected by going from organic depots to private industry. This may not be wrong as far as there is a competition atmosphere; between private companies; however, if the market is not so deep; as the case for Turkey for example in defense sector, then having both private and Public sector is the best assurance of getting both the best price and best solution. Then settling a competition and cooperation atmosphere between them as the main technological sector of military systems (it is also noted that, even USA which although has private competitor companies in many of the defence industrial areas still keeps the public aside). On the other hand, taking the small businesses into the game will provide the possibility of having new innovations; therefore, new, innovative solutions and better prices.

[22] Mention two problems in the world of narrowing/shrinking budget economies; one: cost of weapons, and two: the growth on the need of weapons. Then the solution proposal: 'Control the cost of logistics'; a proposal to solve both problems.

infrastructure, best competencies, operational mission, best value analysis" was deemed necessary on choosing a support strategy for a defence system.

In reviewing of the literature in the origin country of PBL, a paradigm is noted by the researcher; the US paradigm of PBL, which is recognizable with its rigid intention on the pragmatism; to make use of the policy on choosing the PBL strategy to benefit all the stakeholders of the military logistics, in other words, the intention is not only the cost savings of the government, but behind that it is a pragmatistic approach to create a synergistic affect to all the stakeholders. In that context, the insights from the literature review can be collected under five headlines, considering comparing the results of the GTM findings.

The PBL is not a straight forward process that can be applied to any/all defence systems;

1. The product support strategies and their usability criteria need to be defined carefully and explained with a guidance covering all these criteria to decide a PBL strategy arrangement for a defence system or a subsystem. Hence the PBL adoption also covers internal adaptations, such as legislative and regulatory constraints.
2. An additional support infrastructure is also needed to make the required analyses and or investigations scientifically, and to educate and train especially the government HR that is to arrange and manage these contracts.
3. The organic logistic support facilities are still main building blocks of the logistics support and are assembled with both product support strategies; transactional and performance based.
4. The manufacturing industry was put in a both collaboration and competition with organics, or vice versa to control the risks and make the outmost synergistic output in favor of all stakeholders, including SMEs
5. The modern business techniques, and technologic information connections (IT) were created among all the role players, making Randal (2010, 56) associate the PBL to a knowledge intensive supply chain application in Service dominant logic.

The main/key insights of the researcher are as listed above, they are important insights emerged from the literature review. The comparison of these literature insights with GTM findings results in;

One main contradiction between the literature findings and the opinions collected in interviews is:

"Military factories" have completed their life, now the private companies can handle the logistic support more efficiently and economically.

Since no clue found against the military factories existence in the USA has been noticed, that contradiction is falsified.

The other items do not present any mismatch or contradiction; hence they all are approved.

As result, the rest of the findings reached through the GTM analysis match to the literature insights. The literature review has included some governmental documents also to review the actual application guides and directives that the applications have to be done accordingly. The PBL as a government strategy, the applications cannot be apart from those government regulations.

On the other hand, another check can be done from the propositions, there has seen no mismatch on that comparison too. The propositions are objective, universal, testable, falsifiable; hence they can be used in future research, as a model, or for test.

CHAPTER 4

CONCLUSION AND IMPLICATIONS

This part provides a brief conclusion, and implications for practice (as for stakeholders e.g.) and for theoretical studies (as for future research).

PBL's beneficial and sustainable application:

Depot level maintenance is vital for all weapon/defense systems, and it is insourced in armed forces. It cannot be outsourced easily because of the risks of losing the weapon/defense system (when it is needed at war or tension) or paying too much (when it is needed at peace time for training or for deterrence). The USA, has the OEMs that have local, national, and world class, has also O&S service providers of the private/civil companies but especially organic/public depots.

All the private companies are utilizing today's developed, contemporary communication, IT, transportation advantages with continuously developing innovative technics and business methods. Therefore, using the private companies in military logistics presents a vast of new advantages to be explored. It is not a straight job adapting private logistics advantages to military field. Conditions are opposite of each other; risks are endless in war. Therefore, some support could be nice at least at peacetime, but the armed forces had to have the core capabilities at hand always; this brought the US Code Title 10.

Title 10 later has been modified, and still is being modified with the progress achieved in the field of applying private capabilities into organic facilities. As of today, it looks quite mature already, but the Military-Civilian Industry Partnership /MCIP is continuing. Actually, this road of adapting private sources to military should be explored and examined very carefully by the newcomers of the PBL. Because, the picture looks bright, the results are very impressive. Many, when see these impressive results want to apply "the same thing", whatever it is, to their own case, expecting the same results that USA has reached. There is not yet any research evaluating these kinds

of applications, but, the countries need to be very careful on these details because of the two main risks at the end of an unsuccessful PBL application; either unavailability of the weapon/defense system at all or paying too much. Both may be taken under control by sustaining organic depots/military factories) and privet industry as partners and competitors (at the same time), which needs to be defined very carefully. In USA, having all (almost, theoretically 100% of) the OEMs (of defence industry) local and/or national, the competition may be provided by all private companies, however public repair organizations (organic depots/military factories) definitely provide operational reliability and can be competitive on cost too (Gansler, 2001:68). Title 10, on the other hand formulates continuous progress for effectiveness and efficiency of adapting/contributing private sources to military while enhancing overall reliability, and confidence in both maintenance and manufactured products.

7.1 Conclusion

This study was carried out to explore the grounded theoretical proposition of the PBL's beneficial and sustainable application/implementation in aerospace and defence systems; the grounded theory approach was used for analysis of the opinions of the military logistics decision makers/authorities belonging to the key stakeholders in Turkey; as government, user (force command), fundamental logistic service provider, private manufacturing industry, institutions (or academia consisting of the academicians experienced in military logistics, preferably PBL).

As Suddaby (2006:634) states, here understanding and applying GTM was not easy; GTM is used in a way, that is logically consistent with key assumptions about social reality and how that reality is "known" (where the social reality and key assumptions were not resulted in a consistent perception among parties, so do among the interviewees/stakeholders, they all constructed their own meaning out of intersubjective experience of the perception of PBL: the perceptions' inconsistency). And in that case, GTM was more appropriate where the researcher wants "to make knowledge claims about how individuals interpret reality[23]". And the resultant theory is not a presentation of the raw/ripe/known data as Suddaby highlights (2006:635).

[23] The reality here the researcher noticed is the exclusion of the organics from the PBL practices and aiming to reshape them.

The study provided a clear understanding of the key issues in adopting PBL and in adapting to PBL in those countries that have organic service providers and a defence manufacturing industry. It is unavoidable for the countries involving in multinational defence projects, and it is hazardous if not applied in a proper way, however adapting to PBL can bring many advantages in military logistics as efficiency and effectivity in services, besides the infrastructure may provide scientific support as well as needed education that at the end the acquired capabilities may enhance the country's cooperation capabilities in contracts and projects in and abroad, that the new era needs; because the PBL is not easy and requires a well arranged organizations, regulations, and much more importantly skilled competent human resources for all the stakeholders, and especially for the government. And in that context, the organic service providers become the driving force behind this 'PBL's adoption to the country, and country's adaptation to PBL' while providing the assurance for the successful transition to proven PBL strategy in logistic support of aerospace systems, and becoming the fixed alternative for both competition and cooperation needs of the public and private sectors' voyages to the developing competent and competitive new services and products therewith savings in defence budget, while providing security and welfare to the citizens can be achieved that the government is willing.

The three generated theoretical propositions help in:

1) Resolving the blurred points
    a) Defining/re-defining the PBL concept of TR
    b) Defining TR's PBL model
    c) Understanding and eliminating the risks associated w PBL implementation
    d) Re-defining the role of organics place in PBL
    e) Re-defining the statuses of organics and privates in PBL
2) Resolving the PBL application problems (Obstacles, distractors, retarders)
3) Strengthening the importance of scientific support[24]

Where, the administrator is the key executive in PBL; triggering the new initiatives for plans for long term and short term (incentives & disincentives,

[24] 'Meat and Fish Agency' case can be a good example of the effect of adequate scientific support in decision in that context. It has been first privatized, but later it has been re-nationalized, the researcher thinks that the reason of that could be the lack of scientific study support on the first decision caused the second decision.

Transition period/road map) in decisive and strategic way, whereas the all the other key stakeholders are developing themselves.

7.2 Implications

This study probes the implicit key factors of PBL's beneficial and sustainable applications for the countries intending to adapt PBL strategy in their aerospace defence systems. The data is collected from the authorities or skilled experts, and the constructivist approach of Charmaz (2006) was followed utilizing one of the modern up to date CAQDAS tools (MaxQDA). On the other hand, the literature search has shown that, there is a gap in this field in literature. Hence, the results of this study may have implications on both practices and theoretical studies.

7.2.1 For Practices

Grounded Key Factors (Implications to Stakeholders):

Having explained the mainframe of the theoretical proposition based on the implicit factors among the logistics stakeholders; the core factors of application of PBL are listed as:

1) to incentivize the scientific studies in military logistics including PBL
2) to resolve the issues identified among the stakeholders by scientific methods
3) to identify the main service providers' statuses (both in maintenance and manufacturing of military systems for the national needs)
4) to set a strategic plan for defence logistics having a transition plan (similar to manufacturing industry)
5) to apply and manage the strategic plan carefully in order to settle;
    a) to legitimate the necessary regulations
    b) to trigger and follow the progress in the stakeholders
    c) to follow the progress in the development of the scientific studies to support
    d) research and education
    e) climate and culture
    f) effective and progressive PBL applications.

7.2.2 For Further Research

Implications to Future Researchers:

The grounded theory was a correct choice in this study; fitted well and provided robust propositions, however, the researcher warns the future researchers especially planning to use GT approaches in their research studies, to arrange peers in advance to code for cross check, to start to use a CAQDAS tool at the beginning. Coding is the most important part in a GTM study, codings in this study is carried out by the researcher by taking some limited help from her spouse within the time constraints of a doctoral education limits; hence this study with existing data sets can be repeated by a team to get more precise results.

This study as a model, can be repeated in the same field with new data, or this model can be replicated in other untouched fields of military logistics such as army, navy, gendarmerie, or other public logistics support activities such as in 'The General Security Directory'.

The theoretical propositions derived in this study can be tested either in theoretical studies for comparison of the results in public logistic needs, or in future PBL practices.

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APPENDICES

Appendix A: Definition of Terms

Aerospace & Defense Systems: The systems used primarily or secondarily for military purposes in aerospace and defence area.

Aerospace & Defence Sector: The industry group dealing with aerospace and defense systems. It consists of both civilian and government (depots/military factories) organizations that manufacture or provide maintenance and supply services to aerospace and defence systems.

Aerospace & Defense logistics: Logistics Services associated with Aerospace & Defense (A&D), Military Logistics. (Within this study, it refers to the whole (all public/organic military factories) and civilian A&D entities).

Coding: The grouping of the info parts in the data in GT, or Content Analyses.

Collaboration: Following activities shall maintain continuous and effective communications with each other by using IPTs: US DoD acquisitions, capability needs, financial communities, and operational users (US DoD, 2003).

Conop: Concept of operations.

Constructionism: The philosophical approach on focusing to build a social reality (Marvasti, 2004:145).

Contractor: A legal entity, undertaking the responsibility to perform work or provide material; it can be a public, private or mixed-partnership.

Contractor Logistics Support (CLS): "CLS is a method of obtaining logistics support for a product or service for a specified period. CLS could also include maintenance services and materiel provided under equipment warranty programs. In order to be effective, CLS must be planned and coordinated so that usage requirements are tracked, accountability is maintained, and tactical distribution requirements are met." (JP 4-0, 2013:II-8).

Core competencies (core capabilities): Core competencies or core capabilities are the capabilities of organic depots that are required by section 2464 of US Code Title 10.

Death spiral: After the end of cold war, US military needed two things; readiness in short term and modernization in long term in words of arms. However, because of aging equipment (weapons) and difficulties modernizing them in near future since continuing problems around the world (Middle East, North Africa, terrorism. Etc.) make the readiness expenses such as Operations and Maintenance costs go high. More O&M expense means lesser finance left to modernization. This brings the reduced readiness at the end while continuation on the increments on O&M expenses. When modernizations cannot be performed in time, it means more and more expenses on O&M. That means delaying modernization where that means increasing of the O&M expenses. Dr. Gansler calls that situation "death spiral"; "a vicious circle". He points out to civilian logistics and OEMs of the weapons; the world-class ("excellent") with advances especially in information technology! He mentions a transformation on defense logistics that was possible with partnering of public and private. (Gansler, 2000, June 27).

Defence: Preferred word in British English, including Australian and Canadian English.

Defense: Preferred word in American English.

Defense logistics: "Defense logistics" and "military logistics" terms are used interchangeably, assuming no basic differences between them to this study; see 'logistics support'.

Depot/military factory: The place where maintenance, repair, overhaul, and upgrade of weapons' take place; an organic/public/ military industrial facility = 'military depot', Air Logistics Center (ALC) in United States Air Force (USAF). (Depot and Military Factory are equivalent terms).

Depot Level Maintenance (DLM): The maintenance capability of the defense equipment that is very critical to be owned by the military department (government) to have the weapon all the time in the required form without needing any help from outside.

Footprint: The logistics footprint term is used to measure the required entities for the support of a specific (weapon) system, where the stress is on the easiness of the works, besides low level, and less amount of resources of the support entities including personnel.

Grounded Theory Methodology (GTM): An inductive, social, qualitative research method to build an abstract theory by comparing the empirical observations, where the social theory is rooted (Neuman, 2006:60; Neuman, 2014:6).

Life-Cycle Sustainment: "Title 10, US Code 2337: Life-cycle management and product support" mandates US DoD to issue and maintain a guide to develop and implement product support strategies for major weapon systems so that it should be considered since acquisition of the system to be part of the capability requirements and acquisitions. It may include PBL, CLS, any life-cycle product support, sustainment support and weapon systems product support according to Department of Defense Instruction of USA (US DoDI, 2015:111).

Logistics support activities: This is a very broad term, however, here it means the activities for general maintenance (MRO&U) of weapon systems.

Maintenance as a core logistics function: JP 4-0 (2013:II-7) defines maintenance as a core logistics function, it supports 'system readiness' for Force Command, and maintenance services and responsibilities are conducted as described under US Code Title 10. To improve the freedom of action of Force Command and to provide readiness and reliable capabilities of military units at best value, depot and field level maintenance strategy is employed. Depot Level Maintenance that is "most complex and extensive level of maintenance work" is accepted as the "tie between Nation's industrial base and military operations". Here "Nation's industrial base" is presumed as "depot" = "military factory", and depot maintenance is seen as the ultimate source of doing all the necessary technical works on the system including manufacturing, testing, modification, or modernizations on the system with all the technical assistance. Field maintenance, on the other hand is other, but less complex than the "depot level" is again an organic capability that links strategic maintenance capabilities for tactical requirements.

Material: A general term for a tangible substance.

Materiel: A specific term for a tangible substance related to a specific system; e.g., military material. "equipment, apparatus, and supplies used by an organization or institution" (Source https://www.merriam-webster.com/dictionary/mat%C3%A9riel).

Memoing Memo Writing: It may start immediately after gathering the wanted data, Glaser sees it as the building stone of the GT; and core stone of generating the theory; it is needed at every stage of GT till generating the theory (Glaser, 2002).

Military factory: See depot.

Open ended questions: The type of questions that qualitative research relies on, the question is focused on getting the respondent's own answer, with his/her own saying, not choosing from multiple choices (Adapted from Babbie, 2007:G7).

Organic: Government-owned and government-operated (US DoD, 2012, Feb 1:1)

Partnering: A contract and a partnership are interrelated; a Depot level maintenance partnership may be established by a contract between an organic depot and at least one Private-sector entity to collaboratively perform a defined defense work or to utilize organic depot's facilities and/or equipment. The collaborative work is implemented according to the frameworks and business arrangements of respective contract. A partnership can be classified under three groups namely: Work share, Direct Sale of articles and services, and Lease. Under integrated product support, a public-private partnership aiming depot level maintenance capability is a collaborative arrangement between a product support provider of a government owned-government operated facility (for example an organic engine overhaul depot) and one or more private sector entities to perform a defense work by utilizing US DoD facilities and/or equipment. Program offices, inventory control points, sustainment commands, and other government organizations may also participate on these partnership activities (US DoD, 2012:3; and US DoD, 2007b). A depot level maintenance contract and related partnering activity capacity can only be increased to support the US DoD requirement. In the same way, if it is going to provides best value for the US DoD, or improve the support to the warfighter, construction or alterations to the organic facility may be taken into the consideration of the partnership. Moreover, wherever possible, the private sector capital investment at the organic activity is encouraged and justified. Similarly, if the distribution depots or military department logistics activities may be impacted by partnership projects, they also shall be proposed as the new partnership projects (US DoD, 2007b:5).

"Performance-based" approach: "Performance-based Logistics" = "Performance-based Contracting" = "Performance-based Acquisition/Agreement" =" Performance-based Life cycle product support". They are assumed to represent the same meaning and used in that respect; "PBL" is tried to be used as a general term,

while the others may be used to refer the original meanings (in UK case) but here they all three assumed meaning PBL in the general meaning.

Product Support Integrator (PSI): An entity, integrating all private and public sources of a product support arrangement (10 USC § 2337).

Product Support Manager (PSM): A manager assigned to each major weapon system and/or its subsystems (10 USC § 2337).

Product Support Provider (PSP): An entity that provides product support functions. The entity could be part of the US DoD (e.g. organic depot), the private sector, or a partnership between public and private sectors (10 USC § 2337).

Public-Private Partnering (PPP) for sustainment: The requirement about the collaboration on the sustainment strategies for the best use of the public and private sector capabilities through government-industry partnering initiatives, in accordance with the law and policy takes place in US DoD Directive (5000.01) (US DoD, 2003:7).

Stakeholder/s: In a PBL system, User(s), Organic service providers, Foundation companies, National/ local (smaller, medium, or large) companies, Foreign companies' resident associates, Government (regulator/ Moderator/ Acquisition authorities etc.), Taxpayer, Universities/Institutions (The last is assumed by researcher, to get a better understanding and analyses in PBL)

Status quo: Latin word, meaning “the present situation”

Time and Materiel Contract (T&MC): One of the two common after-sales maintenance support contracts (Guajardo, 2011:961); the other is Performance-based contract (PBC).

Transaction Based Logistics (TBL): Wojciechowski (2013) states that transaction-based logistics (TBL) is the traditional logistics support strategy of USA till 2003, when Directive 5000.01 turned it to PBL.

Appendix B: Invitation Letter; Schedule, Informed Consent Form and Interview Questions (Supplementary Interview)

INVITATION LETTER

Subject: Invitation to Doctoral Research Interview 29 May 2016

Dear.....,

I am currently a doctoral student at the University of Turkish Aeronautical Association, Ankara, studying a research project about "PERFORMANCE BASED LOGISTICS: BENEFICIAL APPLICABILITY TO DEPOT LEVEL MAINTENANCE OF AEROSPACE DEFENSE SYSTEMS IN TURKEY".

Being known as a valued source in the field at your sector, with this letter, I am inviting you to participate through an interview process of the research project.

When completed, beside the academic contribution to the field, this grounded theory research is expected to provide tangible results that could be used by the stakeholders of the Performance Based Logistics, which may be classified as User(s), service provider(s), and Government. In that context, genuine opinions of the interview participants (by representing stakeholders or individually) are up most important.

The detailed information for participation are attached as described below.

Your participation to interview which will contribute to the validity of this research is very important and valued for me. I wish your affirmative response and appreciate that.

Sincerely,

Signed
Veli USGURLU

ATTACHMENTS:
A: Scheduling Info, and Informed Consent Form
B: Interview Questions

SCHEDULE

1. Please indicate your preferences of date and place of interview by calling 0555 267 9297 (within one month preferably).

2. You may answer the Attachment-B (The Questions) in any convenient way of yourself (on e-copy, on print, or even on voice record file) in a convenient time and send to me (the addresses are on the top of the first page). This will shorten the interview time.

3. Informed Consent Form (below) may be signed during the interview.

4. You may apply any time to change these conditions or to withdraw.

INFORMATION SECURITY

All the data and knowledge you provide in this process are used, processed/analyzed and protected in accordance with the 6698-numbered law about the 'Protection of the personal data' (28 b and c); only for the scientific/academic purposes, only by myself, as described in this law and after legal obligation they all be completely destroyed.
I declare that, the anonymity will be strictly maintained for all persons except whom who has given permission by written way.

Signed
Veli USGURLU

INFORMED CONSENT FORM OF RESEARCH INTERVIEW

I, by signing this form, declare that I understand the PBL interview process and accept all the rights and responsibilities arising within this procedure as noted here, and I give my permission to voluntarily serve as a participant in the study described with the following checks:
Additional Conditions;

My name in the reports: ☐ can be mentioned. ☐ shall be kept anonym.

Voice record during the interview: ☐ can be done. ☐ shall not be done.

Signature :
Name, Surname :
Date :

INTERVIEW QUESTIONS

1. *PBL knowledge and experience:*

1.1. *Logistics/Maintenance Experience:*
How long have you worked in Military logistics/Maintenance?

Total......Years. (Details: voluntary)

1.2. *Current position:*
What is your current job/position? (Sys. Mngr. of x sys, Procurement Chief, etc.):

.....

1.3. *The origin of the PBL knowledge and experiences:*
What is the origin of your knowledge and experience(s) on PBL?

A- I do not know anything about PBL.

B- I do not know much about PBL.

C- I know some/PBL; I learned by myself.

D- I have attended a PBL course (Name:.....)

E- I have prepared a PBL contract (Name:.....)

F- I have managed a PBL contract (Name:.....)

G- I have thought PBL courses (Name(s):.....)

H- I have prepared/presented flyer/presentation (Info:.....)

I- I have paper(s)/Thesis (Name(s):.....,.....)

J- Other, Write: (.....)

2. *Look on the concepts:*

2.1. *How do you define PBL?*
What does PBL mean to you? What would be the benefits/harms if it is applied in Turkey?

2.2. *Who has to do the maintenance of military defense/attack systems?*
How to decide on the DLM of military systems? In public/in Private, according to what, and how?

2.3. *What do you think about the military factories?*
What are the missions of military factories?

2.4. *Need for Military Factory:*
Are those still needed?

2.5. *Modernization of Military Factories:*
If they are needed, are not they required to be restructured according to the conditions of the era?

2.6. *Foundation Companies:*
Foundation Companies, as the main system manufacturers in defense industry, do they have a mission on the DLM? What do you think?

2.7. *Local Companies:*
Local Companies are starting to get some small roles in defense industry; what could be their mission on DLM?

2.8. *Foreign Companies:*
When, the foreign manufacturing companies are the only source of a special military equipment, what do you think on their position on becoming a PBL candidate company on DLM? What about some new special foreign expert DLM companies?

2.9. *Is it important to have fast and cheap DLM service?*
Today's main competition rule is "servicing in the shortest time, and economically".

2.10. *Trustworthiness of the DLM source:*
The most important aspects of the armed forces is their trustworthiness; then is the trustworthiness of the DLM organization important?

2.11. *Competition; With whom? When? Where? How?*
Today, the organizations who want to survive have to compete with rivals; how can a DLM organization who is assigned/undertaken the military logistics responsibility compete with its rivals?

2.12. *Collaboration/ partnership/ PPP:*
What do you think about collaboration?

2.13. *Integrated Product Teams-IPTs:*
Are you familiar with IPTs? What do you think about IPTs?

2.14. *PPP contracts on DLM:*
What do you think about its applicability?

2.15. *"The collaboration";*
Do we have sufficient amount of collaboration among the entities in our country, generally speaking? Can it be improved?

2.16. *"Military Systems' Maintenance Law":*
What do you think? Is it necessary?

2.17. *"Systematic Innovation":*
What we need for a sustainable innovation?

2.18. *Additions:*
Do you have any additional comments on PBL?

Dear PARTICIPANT,
I appreciate your participation, Thank you very much for your time and patience.
Your participation will contribute to my research related to the development of the military logistics and defense industry of Turkey.

Appendi x C: Davet Mektubu; Program, Bilgilendirilmiş Onam Formu, ve Mülakat Soruları) (Turkish Version of Appendix B)

DAVET MEKTUBU

Konu: Doktora Araştırması Mülakatına Katılım Daveti 29 Mayıs 2016

Sayın.....,

THK Üniversitesinde "PERFORMANSA DAYALI LOJİSTİK: TÜRKİYE'DE HAVA-UZAY SAVUNMA SİSTEMLERİNİN FABRİKA SEVİYESİ BAKIMLARINDA KAZANÇLI UYGULANABİLİRLİĞİ" konusunda İngilizce doktora araştırması yapıyorum.

Bu alanda bilgi ve deneyim sahibi olmanız nedeniyle sizi doktora araştırma çalışmamın mülakatına davet için bu mektubumu yazıyorum.

Performansa Dayalı Lojistik alanında Akademik-Bilimsel katkının yanında, gömülü kuram çalışması şeklinde planlanmış bu çalışma tamamlandığında, konunun paydaşları olan Kullanıcılar, Servis Sağlayıcılar ve Hükümet organları şeklinde gruplanabilecek paydaş gruplarının tamamının kullanabileceği somut sonuçlar doğması beklenebilir. Bu çerçevede mülakat katılımcılarının (paydaşları temsilen ya da bireysel olarak) özgün düşüncelerinin alınabilmesi özel önem taşımaktadır.

Katılım için yapmanız gereken hususlar EK-A'da, Sorular da EK-B'dedir.

Araştırmanın sağlıklı sonuçlandırılabilmesi için özel bir önemi ve değeri olan katkınızı temenni eder, katılımınız için şimdiden en içten teşekkürlerimi sunarım.

İmza
Veli USGURLU

EKLER:
EK-A: Katılımcının Yapması Gerekenler
EK-B: Mülakat Soruları

PROGRAM

1. Mülakat için sizinle buluşabileceğimiz (1 ay içerisinde olması tercih edilir), uygun tarihi ve yeri lütfen 05552679297 numaralı telefona bildiriniz.

2. Ekteki soruları e-dokümanda veya kağıt çıktısı üzerinde kalem ile, veya ses kaydı ile hemen cevaplayıp önceden gönderebilirsiniz; böylece mülakat zamanı kısalacaktır.

3. Katılım Onayı'nın karşılıklı imzalı birer çıktısı mülakat esnasında paylaşılacaktır.

4. Başvurarak, bu koşulları kendiniz değiştirebilir, istediğiniz zaman çekilebilirsiniz.

BİLGİ GÜVENLİĞİ

Bu süreçte edinilecek tüm veri ve bilgiler 6698 sayılı 'Kişisel Verilerin Korunması Kanunu' 28. Madde b ve c şıkları çerçevesinde tamamen bilimsel /akademik amaçlarla ve sadece tarafımca kullanılacak, bu çerçevede korunup işlenecek ve yasal süreç tamamlanınca silinerek yok edilecektir.

Sağlanacak bilgilerin anonimleştirilip genelleştirilerek kullanılacağını, sizin onayınız olmadan sizle ilişkilendirilmiş ya da sizinle ilgili hiçbir özel/kişisel veri ya da bilginin tez raporunda yer almayacağını taahhüt ederim.

İmza

Veli USGURLU

ARAŞTIRMA ÇALIŞMASINA KATILIM ONAMI

Burayı imzalamakla, PDL konusundaki araştırma sürecini ve bu belgede yer alan karşılıklı hak ve sorumlulukları anladığımı ve kabul ettiğimi onaylarım.

İlave Tespitler;

Tezde Katılımcının İsmi: ☐ Geçebilir ☐ Yer almayacak (Anonimleştirilecek)

Mülakatta Ses Kayıt : ☐ Yapılabilir ☐ Yapılmaz

Katılımcı

İmza :

Ad, Soyad :

Tarih :

MÜLAKAT SORULARI

PDL bilgi ve deneyimi:

1.1. *Lojistik/Bakım Tecrübeniz:*
Askeri lojistik/BAKIM alanında kaç yıllık bir tecrübe sahibisiniz?

Toplam......yıl.

1.2. *Mevcut Göreviniz:*
Halen işiniz/göreviniz nedir? (x sistemi- sistem yöneticisi, tedarik Şb.Md. gibi.)

.....

1.3. *PDL Bilgi ve Deneyimlerinizin Kaynağı:*
Performansa Dayalı Lojistik (PDL) bilgi ve deneyim(ler)inizin kaynağı nedir?

☐- PDL hakkında hiç bir şey bilmiyorum

☐- PDL hakkında fazla bir şey bilmiyorum.

☐- PDL'yi biliyorum, kendi imkanlarımla öğrendim.

☐- PDL eğitimi aldım (Adı:.....)

☐- PDL sözleşmesi hazırladım (Adı:.....)

☐- PDL sözleşmesi yönettim (Adı:.....)

☐- PDL dersleri verdim (Adı:.....)

☐- Bildiri/Sunum hazırlayıp sundum (Adı:.....)

☐- Makale /Tez yazdım (Adı:.....)

☐- Diğer, belirtiniz: (.....)

2. *Kavramlara Bakış:*

2.1. *Sizce PDL:*
Size PDL ne ifade etmektedir? Türkiye'de uygulanırsa faydası/zararı ne olur?

2.2. *Askeri Savunma/Silah Sistemlerinin Bakımını Kim Yapmalı?*
Askeri sistemlerin FSB'ının nerede (Kamu'da mı X özel'de mi) yapılacağına neye göre, nasıl karar verilmeli?

2.3. *Askeri Fabrikalar hakkında ne düşünüyorsunuz? Nedir?*
Askeri Fabrikaların misyonları nedir?

2.4. *Askeri Fabrika İhtiyacı:*
Askeri Fabrikalar hala gerekli mi?

2.5. *Askeri Fabrika Modernizasyonu:*
Askeri Fabrikaların eğer gerekliyse günün koşullarına göre yapılandırılmaları gerekmez mi?

2.6. *Vakıf kuruluşları:*
Vakıf kuruluşları, savunma sanayiinde ana sistem üreticileri olarak FSB'de misyonları var mıdır/olmalı mıdır? Ne düşünüyorsunuz?

2.7. *Yerli Firmalar:*
Yerli firmalar yavaş yavaş savunma sanayiinde (küçük de olsa) üreticiler olarak yer almaya başlıyor, bunların FSB'de misyonları ne olabilir?

2.8. *Yabancı Firmalar:*
Yabancı firmalar ihtiyaç duyulan bazı silah sistemleri için tek kaynak durumundalar. Bu üreticilerin ya da ortaya çıkmaya başlayan yabancı FSB firmalarının FSB kavramında yeri nedir?

2.9. *FSB'nin Etkili, Etken ve Ekonomik olması önemli mi?*
Günümüz işletmelerinin temel rekabet unsuru olan Kısa zamanda, Verimli ortamda, Ekonomik olarak icraat şartı FSB işletmelerinde de geçerli olmalı mı?

2.10. *FSB Kaynağının Güvenilebilir ("Trustworthy") Olması:*
Silahlı Kuvvetlerin en önemli özellikleri güvenilirlikleridir, peki silah ve savunma sistemlerinin FSB konusunu üslenenlerin güvenilirlikleri önemli mi?

2.11. *Rekabet; Kimle, Ne Zaman, Nerede, Nasıl?*
FSB görevi almış işletmelerde rekabet konusu nasıl ele alınmalıdır?

2.12. *İş birliği ("collaboration/ partnership/ PPP"):*
İş birliği hakkında ne düşünüyorsunuz?

2.13. *Bütünleşik Ürün Takımları (BÜT'ler/ Integrated Product Teams-IPT'ler)*:
BÜTler hakkında bilginiz var mı? BÜT'ler hakkında ne düşünüyorsunuz?

2.14. *FSB'de KÖİ Sözleşmeleri:*
KÖİ uygulanabilirliği hakkında ne düşünüyorsunuz?

2.15. *İş birliği bizim ülkemizde (sizce yeterince) var mı?*
Olur mu? Geliştirilebilir mi?

2.16. *"Askeri Savunma/ Silah Sistemlerinin Bakımı Kanunu"*:
Ne düşünüyorsunuz? Sizce gerekli mi?

2.17. *Sizce sistematik yenilik ("innovation"):*
Sizce sürdürülebilir yenilik için neler gerekmektedir?

2.18. *İlave bilgi:*
PDL hususunda ilave/karşıt özgün fikirleriniz var mı?

Sayın KATILIMCI,
Araştırma çalışmasına katıldığınız için teşekkür ederim.
Katkınız, Türkiye'nin askeri lojistiği ve savunma sanayiinin gelişimini ilgilendiren araştırmam için katkı sağlayacaktır.

Appendix D: Some Non-Personal, Anonymous Evidences of the Study

Some passages from the interview transcripts:[25]

"... PDL ile ilgili öncelikle hem TSK'da hem de milli savunma sanayimizde bir farkındalık yaratılması ve PDL'nin iyi anlaşılması önem arz emektedir. PDL çoğu zaman özelleştirme, bütün lojistik faaliyetlerin devletten alınıp firmalar tarafından yerine getirilmesi olarak anlaşılmaktadır. Bu yanlış algının kaldırılması önem arz etmektedir. PDL lojistik faaliyetlerin firma ve devlet arasında en maliyet-etkin şekilde paylaşılmasıdır. Bu paylaşımın nasıl olacağı her bir silah sistemi için farklı olabilmektedir. Bu nedenle, her sisteme uygun ortak bir PDL çözümü yoktur. Her sistem için PDL çözümü farklı oluşabilmektedir. ..."

"... PDL, Türkiye'de yeni uygulanmaya başlanılan bir lojistik destek yönetimi modelidir. PDL uygulamalarına yeni başlayan işletmelerin, sistem/alt sistem seviyesinde PDL uygulaması, işletmelerin elde edeceği tecrübe ile daha sonra platform seviyesinde PDL uygulanmasının daha doğru olacağı değerlendirilmektedir. ..."

"... PDL uygulanmasını özellikle devlet-özel sektör iş birliği ile uygulanmak maksimum yarar sağlanacaktır. Yasal ve politik düzenlemeler PDL'nin hedefine ulaşmasında çok önemlidir. Özel sektöre kazandırılan yetenekler ile ülke savunma sanayisinin dışa bağımlılığı azalacaktır. Kazanılan tecrübe ve birikim ile özel sektör uluslararası arenada rekabet etme yeteneği kazanacaktır. Kazanılan birikimler sayesinde yerli sanayinin gelişmesi ve iş payının artması ülkenin makroekonomik değerlerini üst seviyelere çıkartacaktır. ..."

"... PDL uygulanacak programların başarısında, ekonomik, siyasi, sosyo-kültürel ve stratejik kararların önemi çok iyi kavranmalıdır. PDL uygulanacak programın çok iyi analiz edilerek seçilmesi, uygulanacak programın başarıya ulaşması için o ülkenin kaynakları, yetenekleri ve potansiyeli göz önünde tutulmalıdır. ..."

[25] The sources of the opinions are kept confidential in accordance with their anonymity consent.

"... Kazan-kazan prensibi ile yürütülen PDL, müşteri ve yüklenicinin kârlılığı ile ülke kaynaklarının daha verimli kullanılması sonucunda, tasarrufa ve yeni yatırım olanaklarının doğmasına büyük katkı sağlayacağı değerlendirilmektedir. ..."

"... PDL yurtdışındaki üniversitelerde akademik olarak eğitimi verilen bir konudur. Türkiye'de de bu alanda eğitim planlanmasının yararlı olacağı değerlendirilmektedir. Türkiye'de, akademik alanda bu konuda uzman insan gereksinimini sağlayacak akademik yapının oluşturulması, PDL konusunun üniversitelerin ilgili branşlarında ders olarak yer alması, bu alanda akademik çalışmaların da yapılarak, akademik personel yetiştirilmesi, ayrıca işletmelerin yetişmiş insan gücü temininde de kolaylıklar sağlanacaktır. ..."

"... Türkiye'de yaklaşık 750 adet askeri olduğu tahmin edilmektedir. Milli uçak lastiği işletmesi ile yapılacak ürün hazır bulunuşluğu olan 2. Seviye bir PDL sözleşmesi, bu alanda verimli bir PDL uygulama yönetimi olacağı değerlendirilmektedir. Bu seviyede sadece dağıtım sürati değil, daha geniş anlamıyla malzeme hazır bulunuşluğu hedeflenir. Hedeflere ulaşmak sadece ikmal zinciri yönetiminden öte tamir uygulamaları, mühendislik ve teknik destek, konfigürasyon takibi ve hatta küçük değişikliklerin ve uygulamaların yapılmasını gerektirir. Bu seviye devlet gözetimi altında, devlet-özel sektör iş birliği gerektirebilir. ..."

"... PDL'in Türk Savunma Sanayi için öncelikli bir konu olduğunu ve zaman kaybetmeksizin gerek TSK bünyesinde gerekse yerli firmalar tarafından yürütülen yurtdışı projelerinde yaygınlaştırılması gerektiğini düşünüyorum. Bunun yapılabilmesi için bu savunma lojistiği konusunda görev yapan asker/sivil tüm çalışanların farkındalığının arttırılması ve gerekli yasal mevzuat hükümlerinin en kısa zamanda hayata geçirilmesi gerektiğini değerlendirmekteyim."

CURRICULUM VITAE

PERSONAL INFORMATION

Name Surname: Veli USGURLU
Nationality: The Republic of Turkey
Birth Place and Date: Niğde, 04.04.1958
Marital Status: Married, 3 Children
Address: Yukarı Dikmen Mahallesi, 639. Cadde 20/10 Çankaya Ankara
E-Mail: vusgurlu@gmail.com
Contact (Phone): +555 267 9297

EDUCATION

PhD:	Management, University of Turkish Aeronautical Association, 2018
MA:	International Trade and Finance, Çankaya University, 2006
MBA:	Management and Organization, Selçuk University, 2003
BS:	Elec.-Elect. Engineering, Middle East Technical University, 1982

PROFESSIONAL EXPERIENCE

2010-Still:	Uskur Software and IT Services LLC., Business Developer
2011-2013:	Intermak LLC, Technical Advisor and Business Developer
2011-2011:	Megeteknik LLC, Technical Director
2007-2010:	TURAF, Air Logistics Command, Ankara, TU, Head of Quality Management Department
2006-2007:	TURAF, 3rd ASMC, Ankara, TU, Head of Production Shops Management
2001-2006:	TURAF Main HQ, Ankara, TU, Last Position: Manager, Logistics Development Branch
1997-2001:	MoND, Ankara, TU, Position: Manager, NATO Infrastructure on Command and Warning Control Branch
1994-1997:	NAPMA, Brunssum, NL, Position: Prj. Eng., NATO AEW&C Midterm Modernization Program
1982-1994:	TURAF, 2nd ASMC, Kayseri, TU, Last Position: Deputy Head of Technical Management

LANGUAGE

English:	Full professional proficiency
Turkish:	Native