



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

An Analysis of Turkey's Defense Systems Acquisition Policy

**By: Goksel Korkmaz
March 2009**

**Advisors: Dr. Lawrence R. Jones
Michael W. Boudreau**

Approved for public release; distribution is unlimited.

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 2009	3. REPORT TYPE AND DATES COVERED MBA THESIS	
4. TITLE AND SUBTITLE An Analysis of Turkey's Defense Systems Acquisition Policy			5. FUNDING NUMBERS	
6. AUTHOR(S) Goksel Korkmaz			8. PERFORMING ORGANIZATION REPORT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.	
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) The purpose of this MBA thesis is to analyze Turkey's defense systems acquisition policy and its effects on the defense industry over a decade. This thesis provides an overview of the global trends in defense spending and defense markets, explains the defense industry policies of major players in the defense market, gives an overview of second-tier countries' industry development models, explains Turkey's defense systems acquisition policy, and analyzes the policy effects of the defense industry. The thesis concludes with findings and required actions for the future.				
14. SUBJECT TERMS Turkish Defense Industry, Defense Spending, Defense Industry, Offset, Research and Development, Defense Market, Defense Systems Acquisition Policy.			15. NUMBER OF PAGES 121	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited.

AN ANALYSIS OF TURKEY'S DEFENSE SYSTEMS ACQUISITION POLICY

Goksel Korkmaz
1st Lieutenant, Turkish Army

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

**NAVAL POSTGRADUATE SCHOOL
March 2009**

Authors:

Goksel Korkmaz

Approved by:

Lawrence R. Jones, Lead Advisor

Michael W. Boudreau, Support Advisor

William Gates, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

AN ANALYSIS OF TURKEY'S DEFENSE SYSTEMS ACQUISITION POLICY

ABSTRACT

The purpose of this MBA thesis is to analyze Turkey's defense systems acquisition policy and its effects on the defense industry over a decade. This thesis provides an overview of the global trends in defense spending and defense markets, explains the defense industry policies of major players in the defense market, gives an overview of second-tier countries' industry development models, explains Turkey's defense systems acquisition policy, and analyzes the policy effects of the defense industry. The thesis concludes with findings and recommended actions for the future.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	BACKGROUND	1
B.	PURPOSE.....	1
C.	RESEARCH QUESTIONS	2
D.	SCOPE AND RESEARCH METHOD	2
E.	ORGANIZATION OF THE STUDY	3
II.	REVIEW OF LITERATURE.....	5
A.	INTRODUCTION AND BACKGROUND.....	5
B.	DEFENSE SPENDING IN THE WORLD AND MAJOR REGIONS	6
	1. The United States.....	10
	2. Western Europe	11
	3. The Middle East.....	12
	4. Other Regions	13
	5. The Relationship Between Defense Spending and Economic Growth	13
C.	THE DEFENSE INDUSTRY FROM A GLOBAL PERSPECTIVE	14
	1. What is the Defense Industry?	14
	2. Global Trends in the Defense Market	14
D.	DEFENSE SYSTEMS ACQUISITION POLICIES OF SELECTED COUNTRIES.....	17
	1. The United States.....	17
	<i>a. Acquisition Policy</i>	<i>18</i>
	<i>b. Export Policy</i>	<i>19</i>
	<i>c. R&D Policy.....</i>	<i>20</i>
	<i>d. Offset Policy</i>	<i>20</i>
	2. The European Union	22
	<i>a. Industry Policy</i>	<i>23</i>
	<i>b. R&D Policy.....</i>	<i>24</i>
	<i>c. Export Policy</i>	<i>24</i>
	<i>d. Offset Policy</i>	<i>25</i>
	<i>e. Major Countries in the EU</i>	<i>25</i>
E.	DEFENSE INDUSTRY DEVELOPMENT MODELS OF SECOND- TIER COUNTRIES	28
F.	SUMMARY	31
III.	DEFENSE SYSTEMS ACQUISITION POLICY OF TURKEY.....	33
A.	INTRODUCTION.....	33
B.	THE HISTORY OF THE TURKISH DEFENSE INDUSTRY	34
C.	THE IMPORTANCE OF TURKEY HAVING ITS OWN DEFENSE INDUSTRY	36
D.	DEFENSE SYSTEMS ACQUISITION POLICY OF TURKEY.....	39
	1. Law Number 3238	40

a.	<i>Defense Industry Executive Committee</i>	41
b.	<i>Undersecretariat for Defense Industries and Its Role</i>	41
c.	<i>Defense Industry Support Fund</i>	42
2.	Resolution Number 23378	42
a.	<i>Defense Industry Strategy</i>	44
b.	<i>Weapon Systems Classification Strategy</i>	45
c.	<i>Export Strategy</i>	45
d.	<i>R&D Strategy</i>	46
e.	<i>Offset Strategy</i>	47
E.	FINANCIAL RESOURCES FOR DEFENSE EXPENDITURES	48
F.	THE STRUCTURE OF THE TURKISH DEFENSE INDUSTRY	50
G.	SUMMARY	52
IV.	ANALYSIS OF THE EFFECTS OF TURKEY'S DEFENSE SYSTEMS	
	ACQUISITION POLICY ON THE DEFENSE INDUSTRY	55
A.	INTRODUCTION	55
B.	THE RELATIONSHIP BETWEEN DEFENSE SPENDING AND	
	INDUSTRY	56
1.	Defense Spending of Turkey	56
2.	The Turkish Defense Industry with Numbers	58
3.	The Relationship Between Defense Spending and the Defense	
	Industry	59
C.	FINANCIAL VARIABLES OF THE DEFENSE INDUSTRY	64
1.	Defense Industry Exports	64
2.	Offset Applications	71
3.	Research and Development	73
a.	<i>The Relationship Between R&D and Industry Sales</i>	76
b.	<i>The Relationship between R&D and Industry Exports</i>	77
4.	Analysis of Current Program Structures	78
D.	CHALLENGES OF TURKEY'S DEFENSE SYSTEMS	
	ACQUISITION POLICY	81
1.	Selected Acquisition Programs	81
a.	<i>Altay Main Battle Tank Program</i>	81
b.	<i>T- 129 Atak Helicopter Program</i>	82
c.	<i>A400M Future Large Aircraft</i>	83
d.	<i>F-35 Joint Strike Fighter</i>	84
2.	Global Financial Crisis and its Possible Impacts	85
3.	Mergers and Acquisitions	87
E.	SUMMARY OF RESULTS	88
1.	Financial Variables	88
2.	Future Challenges	91
V.	CONCLUSIONS AND RECOMMENDATIONS	93
A.	CONCLUSION	93
B.	RECOMMENDATIONS	93
	LIST OF REFERENCES	95

INITIAL DISTRIBUTION LIST101

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

Figure 1.	World Military Expenditure 1998- 2007	8
Figure 2.	The U.S. Defense Spending vs. the World	11
Figure 3.	Military Expenditures in Western Europe	12
Figure 4.	Military Expenditure in the Middle East	12
Figure 5.	Industry Structure (Ownership)	51
Figure 6.	Industry Structure (Activity Field).....	52
Figure 7.	Defense Spending of Turkey 1988-2008	57
Figure 8.	Defense Spending as a Percentage of the GDP 1988-2008	58
Figure 9.	The Turkish Defense Industry with Numbers 1997-2007	59
Figure 10.	Defense Spending vs. Industry Sales	60
Figure 11.	Defense Industry Exports (By Product).....	69
Figure 12.	Offset Applications by Category 1985-2007	71
Figure 13.	Remaining Offset Commitments by Year	72
Figure 14.	Acquisition Programs – Numbers.....	79
Figure 15.	Acquisition Programs – Value	80

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Military Spending (in Market Exchange Rate).....	9
Table 2.	Top 100 Defense Contractors - By Country	15
Table 3.	Top 10 Defense Contractors - By Company.....	15
Table 4.	The Largest Mergers and Acquisitions in 2007	17
Table 5.	U.S. Military Aid to Turkey.....	50
Table 6.	Regression Analysis.....	61
Table 7.	Regression Statistics	62
Table 8.	Anova Table.....	62
Table 9.	Defense Industry Exports.....	63
Table 10.	Largest Weapon Exporters 2006-2007	65
Table 11.	Arms Share in Exports	66
Table 12.	Aerospace and Defense Industry Exports	67
Table 13.	Aerospace and Defense Industry Imports	68
Table 14.	R&D and Defense Industry Sales	76

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would like to express my gratitude to my wife, Duygu Korkmaz and my daughter Selin Korkmaz, who have supported me throughout my time in NPS. Their unwavering support and encouragement have made my Thesis process enjoyable.

I would like to thank my advisors, Professor L.R.Jones and M. Boudreau, who supported me with their comments, advice and experience. I would like to thank my editor Marie Neal, who assisted me with her special writing skills and advices.

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The purpose of this MBA thesis is to analyze Turkey's defense systems acquisition policy and its effects on the defense industry over a decade. This thesis provides an overview of the global trends in defense spending and defense markets, explains the defense industry policies of major players in the defense market, gives an overview of second-tier countries' industry development models, explains Turkey's defense systems acquisition policy, and analyzes the policy effects of the defense industry. The thesis concludes with findings and recommended actions for the future.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. BACKGROUND

Most of the nations around the world desire having their own defense industries, although this entails serious trade-offs among the resources of a country. The primary reason for desiring a nation's own defense industry, in many cases, is the defense industry's relationship to independence. Nations seek valuable resources to meet their defense needs and the most dependable defense industry is the domestic one.

Developing a domestic defense industry has been a longtime desire for Turkey, going back to the establishment of the Turkish Republic, for several reasons: the first one is having a reliable source of armaments to follow an independent foreign policy; the second one is the set of experiences learned from history; the third one is terrorist attacks in Turkey's Southeast regions; and the last one is its geographical and strategic position and nearness to conflict zones.

This desire followed different paths during the history of the Republic. Turkey's defense systems acquisition policy was structured to achieve this goal in 1985 and revised in 1998. Several laws and regulations followed this revision, but the strategy developed in 1998 still serves as the basis for Turkey's current defense systems acquisition policy.

The analysis of this policy can be conducted from several angles; however, financial variables are the most reliable ones because of their objectivity. Financial variables of the Turkish defense industry, as a whole, are used to conduct this analysis.

B. PURPOSE

The purpose of this research is to evaluate the benefits and challenges of Turkey's defense systems acquisition policy. The primary focus is on policy effects on the defense industry and how the policy has changed the structure of the defense industry since its implementation. This research compares Turkey's defense industry with other countries

and explores its relative position. Defense industry policies of first- and second-tier countries are identified in this research in order to provide insights and a comparative baseline about best practices. Finally, this research evaluates the future challenges of the Turkish defense industry and makes recommendations based on this evaluation.

C. RESEARCH QUESTIONS

The primary research question of this thesis is: “How did Turkey’s defense systems acquisition policy affect the defense industry over a decade? Other research questions that this thesis addresses are as follows:

- What are the global trends in defense spending/military expenditure?
- What are the global trends in the defense market?
- What are the defense industry policies of first- and second-tier countries?
- What is Turkey’s defense industry policy?
- What are the sub-strategies to achieve the domestic industry objectives?
- Why is having a domestic defense industry important for Turkey?
- What is the relationship between defense spending and defense industry sales?
- How did Turkish policy affect defense industry sales?
- How did this policy affect money allocated for Research and Development?
- How did this policy affect offset applications?
- How did this policy affect current program structures?
- What are the future challenges of the Turkish Defense Industry?

D. SCOPE AND RESEARCH METHOD

This thesis is limited to the analysis of financial variables and possible future challenges of the Turkish defense industry. Deductive methodology, from global defense spending to Turkish defense spending, and from the global defense industry to the Turkish defense industry, is used to analyze the policy effects on the industry. The

financial variables of developed countries and second-tier countries are used to structure comparative baselines that can be compared with the financial variables of the Turkish defense industry. The trends in Turkish defense industry variables between 1998 and 2007 and current program structures are analyzed to measure the extent of policy effects on the defense industry. Finally, future challenges are analyzed to provide recommendations about possible opportunities for and threats to the Turkish defense industry.

E. ORGANIZATION OF THE STUDY

Chapter I, Introduction, provides a basic overview of this thesis, including the purpose of the thesis, the research questions to be answered in this thesis, and the scope and research method to be utilized.

Chapter II, Literature Review, provides a background of major variables from the global perspective that is used to analyze the effects of Turkey's defense systems acquisition policy on the defense industry. World defense spending trends, defense market trends, defense acquisition policies of major players in the defense market, and second-tier industry development models are the variables that are explained in this chapter.

Chapter III, the Defense Systems Acquisition Policy of Turkey, gives an overview about the historical development of the Turkish defense industry and the reasons to develop a domestic defense industry. This chapter also provides the background information about defense systems acquisition policy and sub-policies, financial resources of Turkish defense spending, and the structure of the Turkish defense industry.

Chapter IV, Analysis of the Effects of Turkey's Defense Systems Acquisition Policy on the Defense Industry, analyzes the policy effects on the defense industry. Financial variables of the defense industry, such as defense spending, defense industry sales, defense industry exports, the money allocated for R&D, offsets, and current

acquisition program structures, are used as the primary variables to measure the policy effects over a decade. In the first part of this chapter, regression analysis is conducted to find out the relationship, if any, between defense spending and industry sales.

Chapter V, Conclusions and Recommendations, provides a summary of the findings and makes recommendations based on those findings.

II. REVIEW OF LITERATURE

A. INTRODUCTION AND BACKGROUND

This chapter provides a background of major variables from the global perspective that is used to analyze the effects of Turkey's defense systems acquisition policy on the defense industry. World defense spending trends, defense market trends, defense acquisition policies of major players in the defense market, and second-tier industry development models are the variables that are explained in this chapter.

The primary purposes of this chapter are: to give an overview about the global trends in defense spending and the defense market, to explain the defense industry policies of major players in the defense market, and to give an overview about second-tier countries' industry development models. This chapter answers the following research questions:

- What are current trends in defense spending?
- What are the current trends in the defense market?
- What are the defense industry policies of major players in the defense market?
- What are industry development models of second-tier countries?

The first subject explored in this chapter is defense spending. Defense budget of a country mostly constitutes the discretionary part of the government budget and it depends on income from taxation and the balancing of many national priorities. The trade-off among resources may affect the money allocated for defense. However, all other aspects being equal, a change in defense spending reflects mostly the change in threat assessment because countries spend their money on defense based on perceived threat. The increase or decrease in defense spending, including procurement, personnel, operation and maintenance spending, mostly shows the increase or decrease of security concerns. From the defense industry perspective, these increases or decreases are very important for their assembly lines and their future and must be watched. Defense spending includes the demand for defense systems. After the Cold War era, the main reason for the company

mergers and acquisitions in the defense industry was the decrease in demand. The companies that recognized the decreasing demand responded to this trend and consolidated in order to keep from going out of business.

The second subject explored in this chapter is the global defense market. The defense market and the trends in this market show a country's relative position compared to other nations and the competitive power of a country's defense industry. None of the defense companies operate in isolation and they shape their structure according to competing parties in order to sustain themselves. In order to determine the competitive power of a country's defense industry and its companies, the structure of the market and competing parties must be considered. Measuring some aspects, such as technological edge and the ability to strategically partner with other companies, of a defense company is very difficult to measure and in some cases they may be more important than their financial positions, however, their financial position is mostly the major variable that shows their competitive power.

The third subject explored in this chapter is defense systems acquisition policies of major players in the defense market. Major national players in the defense market are driving forces and they shape both today's and tomorrow's defense market. Their acquisition policies and the means they use to develop or sustain their industrial base must be considered in order to exploit the benefits of their best practices and their experiences.

The fourth variable explored in this chapter is second-tier industry development models. These models are important to explore the reasons of failures, if any, and to determine the required actions for the Turkish defense industry.

B. DEFENSE SPENDING IN THE WORLD AND MAJOR REGIONS

There are many definitions for "defense spending," from several sources; most of them divide it into four categories: personnel, equipment, training, and operations. Stockholm International Peace Research Institute (SIPRI) defines it in a broader concept. Defense spending or military expenditure is presented by SIPRI as follows:

“Where possible, SIPRI military expenditure includes all current and capital expenditure on:

- The Armed Forces, Including Peace Keeping Forces
- Defense Ministries and Other Government Agencies Engaged in Defense Projects
- Paramilitary Forces When Judged to Be Trained, Equipped and Available for Military Operations
- Military Space Activities

Such Expenditures Should Include:

- Personnel
 - All Expenditures on Current Personnel, Military and Civil
 - Retirement Pensions of Military Personnel
 - Social Services for Personnel and Their Families
- Operations and Maintenance
- Procurement
- Military Research and Development
- Military Construction
- Military Aid (in the Military Expenditures of the Donor Country)”¹

Defense spending mostly constitutes the discretionary part of any government budget; therefore, deciding how much to spend on defense is always a hard question and always includes serious tradeoffs: between “Guns and Butter” and between “today and tomorrow.” The money allocated for defense is spent either to meet today's urgent needs or to shape tomorrow's force structure. Defense and non-defense spending differ in many ways. Defense spending is an instrument for foreign policy and is always monitored by other countries. They do not care much about how much a country spends on education or social security. Although political effects, international relations, and foreign policy

¹ Stockholm International Peace Research Institute (SIPRI), “The SIPRI Definition of Military Expenditure”. http://www.sipri.org/contents/milap/milex/mex_definition.html (accessed December 20, 2008).

play important roles, threat assessment is the major driver for the defense spending of all countries. Every country decides how much to spend on defense *mostly* according to their own threat assessment.²

After World War II, defense spending had an increasing trend. During the Cold War era, the arms competition between two blocks of the world made defense spending the number-one priority. However, after the Cold War, the general trend of defense spending was negative until 2001. This date marked the change in the global trends in defense spending. When you look at the following graph, you will see that the year 2001 is the turning point. The global average of world defense spending is largely affected by the United States, who makes up 45% of global defense spending. After 9/11, the U.S. had a big increase in its defense spending because of Iraq and Afghanistan operations.

World military expenditure, 1988-2007

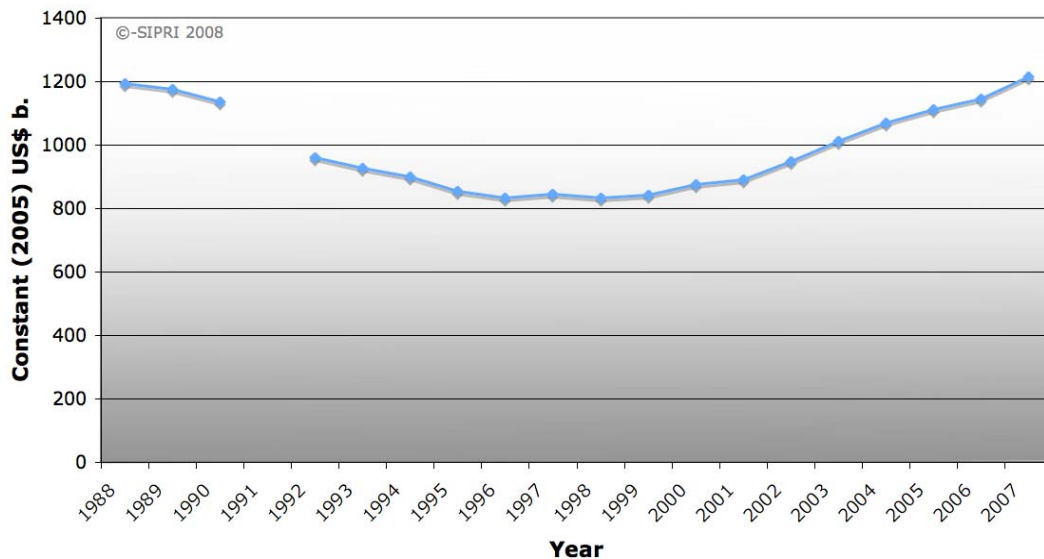


Figure 1. World Military Expenditure 1998- 2007

According to the SIPRI Yearbook 2008, military spending, arms production, and international arms transfers are all on the rise:

² L.R. Jones and McCaffery, *Budgeting, Financial Management, and Acquisition Reform in the U.S. Department of Defense* (Information Age Publishing 2008).

“- World military spending totaled \$1339 billion in 2007, a real-terms increase of 6% since 2006 and of 45 per cent since 1998; This corresponded to 2.5 per cent of world gross domestic product (GDP) and \$202 for each person in the world.”

- Arms sales by the 100 largest arms-producing companies in 2006 increased by 8% in nominal terms over 2005;

- International transfers of major conventional weapons were 7% higher over the period 2003-2007 than in 2002-2006.”³

Most countries spend nearly 2-5% of their GDP on defense. The USA ranks first on military spending with 45% of the world total in 2007, followed by the UK, China, France, and Japan, with 4–5 % each. Fifteen major spenders in world are listed below.

Rank	Country	Military Spending (Billions of \$)	World Share (%)	Spending Per capita (\$)	% of GDP 2006
1	United States	547	45	1799	4
2	UK	59.7	5	995	2.6
3	China	[58.3]	[5]	[44]	2.1
4	France	53.6	4	880	2.4
5	Japan	43.6	4	339	1
6	Germany	36.9	3	447	1.3
7	Russia	[35.4]	[3]	[249]	3.6
8	Saudi Arabia	33.8	3	1310	8,5
9	Italy	33.1	3	568	1.8
10	India	24,2	2	21	2.7
11	South Korea	22.6	2	470	2.5
12	Brazil	15.3	1	80	1.5
13	Canada	15.2	1	461	1.2
14	Australia	15.1	1	733	1.9
15	Spain	14.6	1	336	1.2

*[] Estimated

Table 1. Military Spending (in Market Exchange Rate)⁴

³ SIPRI YEARBOOK 2008, “Armaments, Disarmament and International Security”. <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

⁴ SIPRI YEARBOOK 2008, “Armaments, Disarmament and International Security”. <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

A brief overview of the following regions is given below: the United States, Western Europe, the Middle East and some other regions.

1. The United States

Since World War II, the defense spending of the U.S. has never been as high as it was in 2007. Military operations in Iraq and Afghanistan were the major contributors to this increase. Since 2001, U.S. military expenditure has increased by 59% in real terms. The U.S. is by far the largest spender in terms of military spending: “The United States spends more than the next 45 highest spending countries in the world combined. The United States accounts for 48 percent of the world's total military spending. The United States spends on its military 5.8 times more than China, 10.2 times more than Russia, and 98.6 times more than Iran. The United States and its strongest allies (the NATO countries, Japan, South Korea and Australia) spend \$1.1 trillion on their militaries combined, representing 72 percent of the world's total.”⁵

⁵ Travis Sharp, “U.S. military spending vs. The world,” The Center for Arms Control and Nonproliferation.
http://www.armscontrolcenter.org/policy/securityspending/articles/fy09_dod_request_global/ (Accessed December 12, 2008).

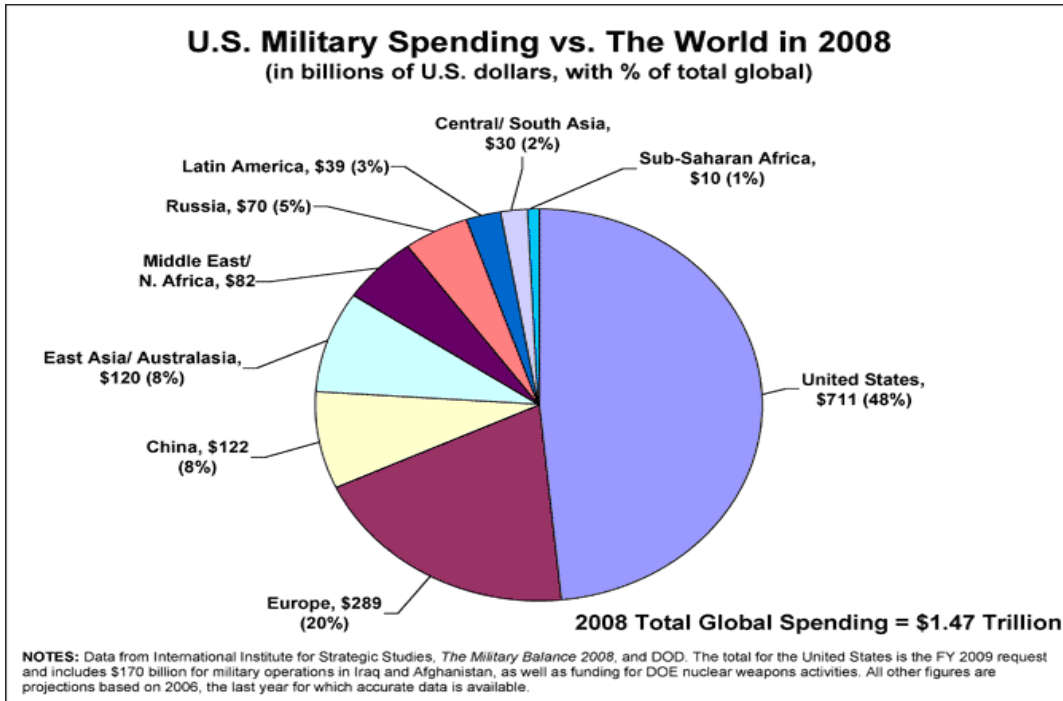


Figure 2. The U.S. Defense Spending vs. the World

2. Western Europe

Due to its distance from conflict zones and its stabilized regional policies, Western Europe has the lowest growth rate in defense spending, at 6%.

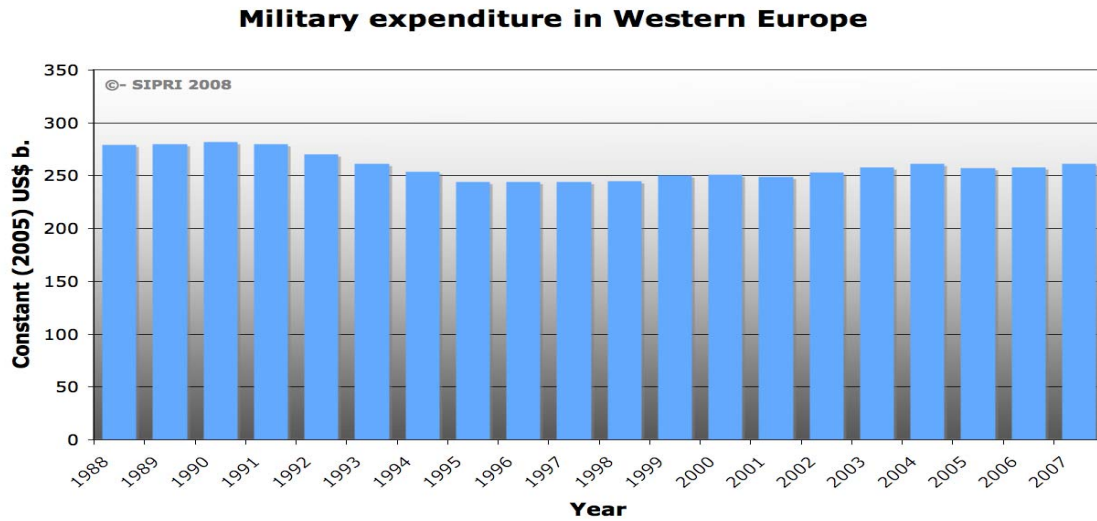


Figure 3. Military Expenditures in Western Europe⁶

3. The Middle East

Being the center of most of the conflicts and wars within the last few decades, the Middle East has one of the biggest increase rates in defense spending. The increase rate of the Middle East is 62% since 1998. High oil prices in recent years is another cause of this increase.

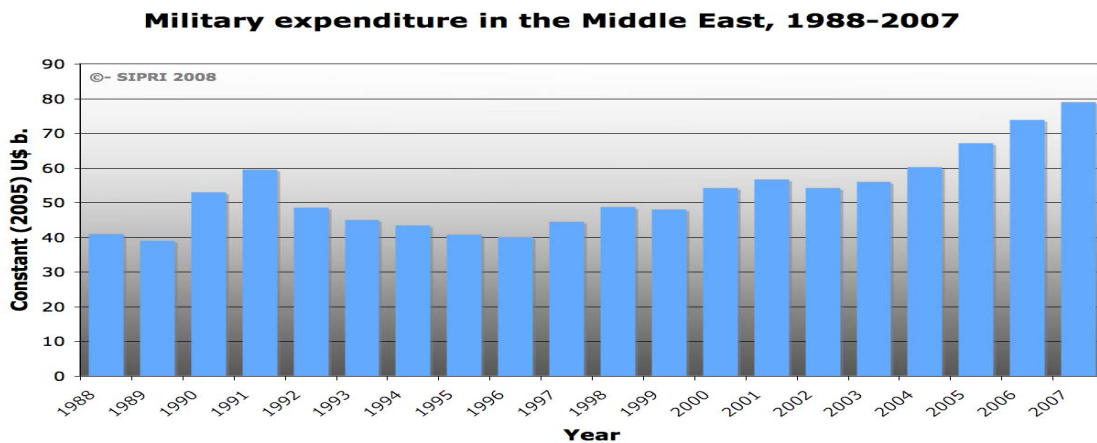


Figure 4. Military Expenditure in the Middle East

⁶ SIPRI YEARBOOK 2008, “Armaments, Disarmament and International Security.” <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

4. Other Regions

Eastern Europe has the highest increase in military spending since 1998 with 162%. Russia was the main contributor for this increase, with a 13% increase in 2007.

China is another country that has increased its defense spending over the decades, but because of its rapid economic growth, its military spending is only 2.1% of the GDP.

South Caucasus is the other region in which military spending has increased during previous decades, because of the conflicts in that region.

According to the SIPRI Yearbook 2008, “The number of countries that increased their military spending in 2007 was higher than in recent years. The factors driving increases in world military spending include countries’ foreign policy objectives, real or perceived threats, armed conflict, and policies to contribute to multilateral peacekeeping operations, combined with the availability of economic resources.”⁷

5. The Relationship Between Defense Spending and Economic Growth

Many studies have been conducted about the relationship between defense spending and economic growth. However, there is no consensus among economists on how defense spending affects the total output of a country.

In some countries defense spending has negative impacts; however, in some it has positive impacts, and in some countries it may have no effect. A recent study conducted by Atesoglu showed that defense spending in the U.S. has positive impacts on the aggregate output of the U.S.⁸

According to another study conducted by Halicioglu about Turkey, defense spending also has positive impacts on the aggregate output of Turkey.⁹

⁷ SIPRI YEARBOOK 2008, “Armaments, Disarmament and International Security.” <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

⁸ Sonmez Atesoglu, *Defense Spending And Aggregate Output In The United States* (School of Business, Clarkson University, NY, USA September 2007).

⁹ Ferda Halicioglu, “Defense Spending and Economic Growth in Turkey: An Empirical Application of New Macroeconomic Theory,” *Review of Middle East Economics and Finance* 2004, 2(3), 193–201.

C. THE DEFENSE INDUSTRY FROM A GLOBAL PERSPECTIVE

1. What is the Defense Industry?

The “Defense Industry is a group of private or state-owned companies that, in constant contact with other industrial branches, designs, develops and produces all kinds of defense systems needed by the armed forces of a country.”¹⁰ The defense industry and any other industry differ mainly in the degree of need for extensive technology, the need for logistic support, the need for big investments, the need for secrecy and security, only one customer inside the country and political effects on foreign sales.

2. Global Trends in the Defense Market

The United States is the biggest player in the global defense market, holding more than 40% of the defense market, and is followed by the United Kingdom, Russia, and France. According to *Defense News*, the U.S. has 45 companies in the world’s top 100 defense contractors list and 7 companies in the top 10.

Country	Companies Counted
United States	45
United Kingdom	10
Russia	9
Japan	9
France	5
Israel	4
India	3
Germany	3
Italy	2
Turkey	1
Switzerland	1
Sweden	1
South Korea	1
Singapore	1
Finland	1

¹⁰ Husnu Ozlu, “Turkish Defense Industry After Second World War” (PhD diss. Dokuz Eylul University 2006), 7.

Canada	1
Australia	1
Norway	1
Netherlands	1
TOTAL	100

Table 2. Top 100 Defense Contractors - By Country¹¹

Rank	Company	Country	2007 Defense Revenue*	% of Revenue from Defense
1	Lockheed Martin	U.S.	\$38,513.00	92
2	Boeing	U.S.	32,080.00	48
3	BAE Systems	U.K.	29,800.00	95
4	Northrop Grumman	U.S.	24,597.00	77
5	General Dynamics	U.S.	21,520.00	79
6	Raytheon 1	U.S.	19,800.00	93
7	EADS	Netherlands	12,239.20	21.3
8	L-3 Communications	U.S.	11,239.70	81
9	Finmeccanica	Italy	10,601.60	53.6
10	United Technologies	U.S.	8,761.40	16

Table 3. Top 10 Defense Contractors - By Company¹²

Lockheed Martin is the biggest defense contractor in the world and is followed by Boeing. BAE Systems ranks in third and the other two non-US defense contractors in the top ten are EADS from the Netherlands and Finmeccanica from Italy. Turkey has only one firm in this list of the top 100 defense contractors, ASELSAN, which ranks 86th in 2008. In 2007, ASELSAN ranked 97th in this list.

The global trends in the defense market have changed the rules of open market, from the defense companies' perspectives. Countries are nearly following the same paths to keep themselves alive and to improve. Government protection, import limitations and restrictions, and different procedures for defense systems acquisitions are some of the means that most governments use. For underdeveloped and developing countries and

¹¹ *Defense News*, "Top 100 Defense Contractors List."
http://www.defensenews.com/static/features/top100/charts/top100_08.php?c=FEA&s=T1C (Accessed January 9, 2009).

¹² *Defense News*, "Top 100 Defense Contractors List."
http://www.defensenews.com/static/features/top100/charts/top100_08.php?c=FEA&s=T1C (Accessed January 9, 2009).

their young defense industries, taking part in global contracts and even in consortiums for government projects is becoming more and more difficult.

The U.S., holding more than 40% of the global defense market, is performing the defense industry development model successfully, with overlapping defense and industry strategies, creating employment and increasing domestic production. The commercial competition between the U.S. and the E.U. shows its effects on the defense market. The European Union countries are restructuring their institutional infrastructure to enhance their collective acquisition systems and collective defense industries.¹³

In order to respond competitively to mergers and acquisitions in the U.S., and to increase their effectiveness against increasing costs of defense systems, most of the companies working in the defense market all around the world are consolidating their powers with mergers and acquisitions. In every major activity field a couple of big companies are dominating the market. The Defense Ministers of European Union countries such as France, Germany, the United Kingdom, Italy, Sweden, and Spain decided to restructure the European defense industry. Based on their decision, the following companies now specialize in the following fields:

- THALES, avionic systems and ship electronics
- EADS, military and civilian aviation and space systems
- BAE, military aviation, shipbuilding, avionics, and radar systems¹⁴

In 2006, there was only one big deal, over \$1 billion, in the defense industry. The number of big deals and mergers increased in 2007 to seven, and the largest of these deals was worth \$4.8 billion. Six of these big buyers were U.S. companies.

Four of the acquired companies rank among the SIPRI Top 100 arms-producing companies for 2006: Armor Holdings, EDO Corporation, United Industrial Corporation and ARINC. In addition, three former subsidiaries bought in 2007 had arms sales large enough to rank them

¹³ *Turkish Defense Industry Special Commission Report*, "Ninth Development Plan" 2007, 6. www.dpt.gov.tr/DocObjects/Download/3272/oik699.pdf (Accessed December 16, 2008).

¹⁴ *Defense Industry Special Commission Report*, "Ninth Development Plan." 2007, 6. www.dpt.gov.tr/DocObjects/Download/3272/oik699.pdf (Accessed December 16, 2008).

among the Top 100: Devonport Management Ltd (DML, with arms sales of \$780 million in 2006), Smiths Aerospace (sales of \$1.3 billion) and Thales's naval operations (sales of \$1.6 billion).¹⁵

Buyer Company (Country)	Acquired Company (Country)	Seller Company (Country)	Deal Value (U.S. \$m)
General Electric (USA)	Smiths Aerospace (UK)	Smiths Group (UK)	4800
BAE Systems (UK)	Armor Holdings (USA)	Publicly listed	4532
URS Corporation (USA)	Washington Group (USA)	Publicly listed	3100
Carlyle Group (USA)	ARINC (USA)	Privately owned	Undisclosed
ITT Corporation (USA)	EDO Corporation (USA)	Publicly listed	1700
Meggitt (UK)	K&F Industries (USA)	Publicly listed	1300
Veritas Capital (USA)	Aeroflex (USA)	Publicly listed	1300
Textron (USA)	United Industrial Corporation (USA)	Publicly listed	1100
Thales (France)	67% of Alcatel Alenia Space (France) + 33% of Telespazio (Italy) (USA)	Alcatel Lucent (France)	895
DCN (France)	Thales' Naval Operations (France)	Thales (France)	714*
Babcock International (UK)	Devenport Management Ltd. (DML) (UK)	KBR (USA)	699

Table 4. The Largest Mergers and Acquisitions in 2007¹⁶

D. DEFENSE SYSTEMS ACQUISITION POLICIES OF SELECTED COUNTRIES

1. The United States

The United States defense industry owes its prosperity mostly to the Cold War era. Huge domestic demand and competition between two blocks caused the U.S. defense

¹⁵ SIPRI YEARBOOK 2008, "Armaments, Disarmament and International Security," <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

¹⁶ SIPRI YEARBOOK 2008, "Armaments, Disarmament and International Security," <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

industry to flourish. However, after the Cold War ended, large budget cuts and decreases in military spending slowed this growth. Military spending in the defense sector declined from \$422 billion in 1989 to \$290 billion in 1999. This decline in demand forced defense industry companies to consolidate their power. According to a Pentagon report in 2003, the 50 largest defense suppliers of the early 1980s have become today's top five contractors.¹⁷

Between 2000 and 2008, the U.S. defense budget returned to Cold War levels, and today it almost accounts for half of the world's defense spending. As mentioned earlier, the U.S. has the biggest defense industry in the world, and it has 45 companies in the Top 100 defense contractor list. According to a study conducted by E.C.YODER, in 2003, 64.04% of \$209 billion dollars spent for contract awards went to the Top 100 defense contractors, and the Top 10 contractors received \$83 billion, which constitutes 39.72% of the total dollars that the U.S. expended.¹⁸

Sustaining the industrial base for defense asset production is the major challenge today's U.S. defense industry is faced with. Growing Operations and Maintenance costs, because of aging equipment and increased equipment complexity, decreased the share of the acquisition budget, versus O&M budgets. O&M costs have increased since 1997 and comprised a 39% share of the DoD budget in FY2002.¹⁹

a. Acquisition Policy

The United States defense systems acquisition policy is based on protecting the industrial base with laws and regulations. The Buy American Act, codified in 1933, and the Berry Amendment, codified in 1941 and amended by Congress in 2002,

¹⁷ Terrence R. Guay, "The Transatlantic Defense Industrial Base: Restructuring Scenarios and Their Implications," *Strategic Studies Issue* 2005, 2. <http://www.strategicstudiesinstitute.army.mil/Pubs/display.cfm?pubID=601> (Accessed December 26, 2008).

¹⁸ Elliot Yoder, "Engagement Versus Disengagement." *Acquisition Research Paper* Naval Postgraduate School November 2004, 12. <http://bosun.nps.edu/uhtbin/hyperionimage.exe/NPS-AM-05-001.pdf> (Accessed December 26, 2008).

¹⁹ L.R. Jones and J.L. McCaffery, *Budgeting, Financial Management, and Acquisition Reform in The US Department of Defense* (Information Age Publishing 2008), 530-535.

are two examples of these regulations. However, there are many exceptions to these laws, and the authority to waive these laws was granted to the President in the implementation of international obligations and in favor of public interest.²⁰

Acquisition policy requires close coordination between the government and industry representatives, and this relationship facilitates “political maneuvering to obtain the resources to invest in innovative projects.”²¹ Political effects play an important role in U.S. defense spending allocation processes and on the defense industry.

b. Export Policy

As the biggest defense industry exporter in the world, the United States’ export policy is based on two programs. The first one is Foreign Military Sales (FMS) and the other one is Direct Commercial Sales (DCS). For FMS, the Department of State makes recommendations and the President designates the eligible countries; the same acquisition procedures and processes are used by the Department of Defense (DoD), on behalf of foreign governments. All DCS are subject to the approval of the Department of State, the U.S. Congress, and applicable export laws and regulations. DCS require the customer’s involvement in the process.²²

Export policy is based on sustaining technological superiority to ensure U.S. military dominance. In order to control and inform export decisions, two lists are developed: the first one is the Military Critical Technologies List (MCTL), and the second one is Developing Science and Technologies List (DSTL). The MCTL covers technologies that are of concern in the near term, while the DSTL covers those in the longer term. These lists are reviewed to decide whether the technology is critical or not and an export decision is given after this evaluation.²³

²⁰ Jason W. Bales and Nicholas G. Feranec, “Defense Globalization: Impacts On The United States Defense Acquisition System,” (Thesis diss. NPS, December 2007), 19-20.

²¹ Peter Dombrowski and Eugene Gholz, *Buying Military Transformation* (Columbia University Press 2006), 26.

²² DoD Security Cooperation Agency, “Overarching Description.” Frequently Asked Questions <http://www.dsca.mil/pressreleases/faq.htm> (Accessed December 10, 2008).

²³ *GAO report*, “DOD’s Critical Technologies Lists Rarely Inform Export Control and Other Policy Decisions.” July 2006, 1. <http://www.gao.gov/products/GAO-06-793> (Accessed December 12, 2008).

c. R&D Policy

U.S. superiority and its success rely heavily on the amounts that are allocated for research and development. During the Cold War, Russia was the biggest spender on R&D, but after it ended, the U.S. took the lead and increased its emphasis on R&D. The average R&D share of defense budget is the major indicator of this emphasis. Defense R&D spending had a 15% average share of the defense budget. “In fiscal year 2005, U.S. defense R&D spending was \$70.93 billion (2005 prices) and in 2006 the figure is \$72.4 billion (current prices: AAAS, 2005). Some 7.5% of the 2006 defense R&D budget was allocated to defense research.”²⁴ In 2008, the money allocated from the Federal Budget just for weapon systems development was \$68.1 billion²⁵ and the money allocated for the entire R&D portfolio was \$137.972 billion.²⁶

d. Offset Policy

The offset policy of the U.S. has changed several times in recent years. In first offset applications, Offset policy was a government responsibility and used as an instrument; to establish national defense industries, to improve economic structure of allied countries by providing employment, to provide regional stability, and used as an export tool. After 1978, the policy changed direction and responsibility was given to private military firms with some limitations. The most important limitation was technology transfer.²⁷

Governments became more sophisticated about using offsets to achieve their industrial and employment objectives. In 1998, defense offsets totaled \$3 billion. With the increasing trend of offset, the U.S. became more concerned about offsets

²⁴ Keith Hartley, “Defense R&D: Data Issues,” *Defense and Peace Economics*, December 2005, Vol. 17(3), 169–175.

²⁵ *American Association for the Advancement of Science*, “Preliminary Analysis of R&D in the FY 2008 Budget,” February 2007. <http://www.aaas.org/spp/rd/prel08p.htm> (Accessed December 28, 2008).

²⁶ *National Science Foundation*, “President's FY 2009 Budget Requests 3.4% Increase in R&D Funding” <http://www.nsf.gov/statistics/infbrief/nsf08312/> (Accessed March 14, 2009).

²⁷ Michael Woodward, “An Analysis of the Impact of Offset Requirements on the U.S. and Defense Industry” (Thesis diss. NPS 1995), 30-35.

because of their negative impacts. According to the GAO report in 2000, the U.S. did not gain what was expected from offset applications. Although it increased exports and defense industry sales, a great amount of employment opportunities went abroad. In many cases, “U.S. technology transfers improved foreign firms’ competitiveness but rarely resulted in technology transfer back to the United States.” Another concern was about contract values and competition because they could undermine fairness and competitiveness and could distort the price of the contract.²⁸

In his article, Barry Marvell described the U.S. offset policy as follows: “The U.S. government’s official position, however, continues to be that offset inhibits world trade by compromising the transparency and level playing field of government acquisition. However, while offsets certainly complicate trade, it is difficult to object to offsets when the purchasing countries impose the requirements and the process is open to all competitors.”²⁹

According to the report prepared by the U.S. Department of Commerce, “During 1993-2006, U.S. companies reported entering into 582 offset agreements with 42 countries related to export sales totaling \$84.3 billion. These offset agreements were valued at \$60 billion and equaled 71.2 percent of the export contract value, the same percentage as reported during the 1993-2005 period.”³⁰ According to the same report, the U.S. should participate in joint productions instead of direct sales, which require offsets, in order to protect U.S. dollars from going abroad.

²⁸ GAO, “Defense Trade Report,” May 2003, 1. <http://www.gao.gov/new.items/d05234.pdf> (Accessed December 12, 2008).

²⁹ Barry Marvel, “International Offset Practices,” *Contract Management Magazine*, May 2001.

³⁰ U.S. Bureau of Industry and Security, “Offsets in defense Trade, 12th report to Congress,” December 2007, iv. http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/12th_report_to_congress.pdf (Accessed January 12, 2009).

2. The European Union

Developing a common defense industry policy and collective procurement structure is one of the biggest challenges of the EU today. Although the GDP of the EU is greater than that of the U.S. (in 2008 the EU's combined GDP was over US\$14.960 trillion, compared to US\$14.580 trillion for the USA)³¹, there is a huge gap between them from the defense industry sales and industry exports perspective. "While many EU politicians and officials may consider development of EU-wide armaments and defense industry policies *desirable*, there is no overriding *imperative* for the EU to do so."³² According to several EU officials, this approach is hard to sustain and the EU needs a powerful industry policy to maintain its technology baseline. Javier Solana, High Representative for Common Foreign and Security Policy, stated that: "None of us can any longer afford to sustain a healthy and comprehensive DTIB (defense technology industrial base) on a national basis. The future health, maybe even survival, of Europe's defense industry requires a European approach, and a European strategy. We must develop greater mutual reliance on diverse centers of excellence, and less dependence on non-European sources for key defense technologies."³³

In order to develop a collective effort to structure a common policy for defense, the European Defense Agency (EDA) was established in 2004. The objectives of this organization are to harmonize defense requirements, to initiate collaborative efforts, to promote and enhance European procurement cooperation, to strengthen the European defense industry and technology base and to enhance the effectiveness of research and development in European defense.³⁴

31 CIA, World Fact Book 2008, "Rank Order - GDP (purchasing power parity)." <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html> (Accessed January 5, 2009).

32 Stefan Markowski and Robert Wylie, "The Emergence of European Defense and Defense Industry Policies." *Security Challenges Journal* Volume 3 number 2, 2007, 31.

33 European Defense Agency, Press Release, "Radical Change and True European Market Needed to Secure Future of European Defense Industry," February 1, 2007. <http://www.eda.europa.eu/newsitem.aspx?id=58> (Accessed December 12, 2008).

34 European Defense Agency, Press Release, "Radical Change and True European Market Needed to Secure Future of European Defense Industry," February 1, 2007. <http://www.eda.europa.eu/newsitem.aspx?id=58> (Accessed December 12, 2008).

A code of conduct related to defense procurement regulation was released by the EDA in 2005. This code of conduct is not binding and requires voluntary participation of European countries. The basic principles of this code are: “There will be mutual accountability, with the EDA monitoring how the code is respected or ignored, It will provide mutual assurance of security of supply, It will provide fair and equal treatment of suppliers, it will establish best practices and certain categories such as procurement of research and technology, collaborative procurements, and procurements of nuclear weapons and nuclear propulsion systems will be exempt from this code.”³⁵ The success or failure of this code of conduct is still unknown but 22 EU countries approved this code.

a. Industry Policy

The European Union’s collective defense efforts and defense industry restructuring started at the beginning of the 1990’s. Until 1999 the efforts were limited to acquisition of small firms, joint ventures and multinational consortia. Political effects played a dominant role in hindering cross-border mergers and acquisitions. Most of the countries in Europe wanted to sustain their domestic defense industry structure. But at the end of the 1990’s, mergers and acquisitions became unavoidable because of economic and political pressure. The first consolidation occurred in the UK in 1999, and this consolidation was named BAE systems.³⁶ Other consolidations followed, and after these consolidations, four firms dominated the European defense market: BAE Systems (UK), Thales (France), Finmeccanica (Italy), and EADS (multiple countries). After these consolidations, they became competitive with U.S. firms. As mentioned earlier, the EU

³⁵Claire Taylor, “European Security and Defense Policy: Developments since 2003,” *Library House of Commons, Research Paper* 06/32, June 2006, 46.

³⁶ Terrence R. Guay, “The Transatlantic Defense Industrial Base: Restructuring Scenarios and Their Implications,” *Strategic Studies Institute United States Army War College*, 2005, 3.
<http://www.strategicstudiesinstitute.army.mil/Pubs/display.cfm?pubID=601> (Accessed December 6, 2008).

has 3 firms in the Top 100 defense contractors list and the biggest one is BAE Systems, who bought Marconi and parts of Lockheed Martin and is seeking opportunities and market share in North America.³⁷

b. R&D Policy

The two biggest differences between the defense markets of the U.S. and the EU come from the size of domestic demand and the R&D money allocated for defense. Economies of scale fed by huge domestic demand played a dominant role in developing U.S. defense industry structure. Although most of the defense industries in the EU are very high-tech domain and mostly funded by their own Ministries of Defense, there is a big gap between the R&D spending of European Countries and the U.S. The U.S. R&D spending was four times more than the EU's R&D spending between 1997 and 2001. Another difference in R&D spending is that in the U.S., the government's assistance is much higher than in the EU. European companies spent 6.6% of their turnover on R&D in 2001 and 20% in 2006, whereas American companies spent only 3.2% of their sales on R&D and other R&D money comes from government assistance.³⁸

c. Export Policy

The EU Code of Conduct, which sets restrictions on arms exports to other countries, forms EU policy on exports. According to this code, arms transfer to the countries that may destabilize the region, and that are suspected of potential diversion or re-export to other countries are restricted according to this policy.. Another regulation about exports is in Article 296 of the Treaty on European Union which allows national governments to exempt defense equipment trade from EU scrutiny.³⁹ Offsets are used as a powerful export tool all over Europe.

³⁷Katia Vlachos-Dengler, *Off Track? The future of the European Defense Industry* (International Defense Research Institute, RAND Publications 2004), 13.

³⁸ Katia Vlachos- Dengler, *Off Track? The future of the European Defense Industry* (International Defense Research Institute, RAND Publications 2004), 105.

³⁹ Katia Vlachos- Dengler, *Off Track? The future of the European Defense Industry* (International Defense Research Institute, RAND Publications 2004), 80.

d. Offset Policy

The same article mentioned in the previous paragraph, Article 296, gives EU members equal opportunity as in exports. The offset policy of a country is not under scrutiny of the EU. For this reason, every EU country has adopted different offset policies, in order to exploit the benefits of offsets. The commonality of their offset policies is the required percentage. Most European countries require 100% offset on their procurements. For example, the UK, France, Germany, Denmark, and the Netherlands all require 100% offset on their procurements.⁴⁰

e. Major Countries in the EU

(1) The United Kingdom. As a response to the changing global defense market, The UK introduced their Defense Industrial Policy in 2002, which affirmed government support for defense exports. Whatever changes the Defense Industrial Policy will bring about, support for defense exports will continue to be a part of UK policy. “In 2004, new defense export orders won by UK industry were valued at four and a half billion pounds. This helped maintain the UK’s position as the most successful defense exporter in Europe, and second only to the U.S. world-wide.”⁴¹

The aim of UK defense procurement is: “to buy equipment for the Armed Forces that meets their requirements and timescales with the best value for money.” Every year the Ministry of Defense (MOD) spends around £12 billion on goods and services. No other organization in the United Kingdom spends more on such a wide range of acquisitions, from military equipment to food, stores, and clothing.⁴²

⁴⁰ U.S. Department of Commerce/BIS offset database, “Offsets in defense trade eleventh report to Congress”, January 2007.

⁴¹Gavin Mackay, “Governmental Initiatives in Defense Exports”. Senior Military Advisor to Defense Export Service Organization (DESO), *SSM defense industry Conference 2007*.

⁴²*Defense Systems Management College*, “A Comparison of the Defense Acquisition Systems of France, United Kingdom, Germany And The United States,” 3-16. <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).

The Defense Procurement Agency (DPA) is the single biggest purchaser of manufactured goods in the United Kingdom. The DPA buys over £5 billion of new systems, equipment, and initial logistics support for the Armed Forces each year. In the UK, foreign contractors are free to bid for the majority of MOD business; as prime, or as subcontractors. But the evaluation of these bids is made under the considerations of security, international obligations, and special factors that may affect the government. Offsetting some of the value of a contract is another important factor that is considered while evaluating the bids. Many countries have registered partnerships and collaborations in the UK in order to do business with the government easily.⁴³

The Defense Export Service Organization (DESO), whose role is to assist defense companies and overseas customers interested in British defense products, and ministers actively participate on behalf of defense firms, assisting defense industry companies in finding customers around the world.⁴⁴

(2) Germany. The Federal Office of Military Technology and Procurement, “Bundesamt für Wehrtechnik und Beschaffung” (BWB), is the major organization in Germany that is responsible for the definition, development, engineering, test and evaluation, production, and procurement of military weapon systems.⁴⁵ Germany has the third largest defense budget in the EU.

The German defense industry is totally privately owned and major producers in the defense market have substantial civilian components. But this private ownership is not a burden for acquisition authorities and they work closely with industry

⁴³ *Defense Systems Management College*, “A Comparison Of The Defense Acquisition Systems Of France, United Kingdom, Germany And The United States”, 3-16. <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).

⁴⁴ Jocelyn Mawdsley and Michael Brzoska, “Procurement, Arms Exports and Industrial Offsets in Britain and Germany” *Arms Trade Offsets: Theory, Policy, and Case Studies*, London, Routledge, 2004, 111.

⁴⁵ *Defense Systems Management College*, “A Comparison Of The Defense Acquisition Systems Of France, United Kingdom, Germany And The United States”, 3-16. <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).

authorities. Competition is very limited and certain companies, in many cases consortia, are preferred suppliers for certain types of defense systems. Direct offsets have played an important role in building and supporting the German defense industry.⁴⁶

(3) France. The Minister of Defense, assisted by the Joint Armed Forces Chief of Staff, is the main authority to implement defense in France.⁴⁷ Direction Generale de l'Armement (DGA), an organization created in 1961, is responsible for procuring the necessary equipment for the French Armed Forces.⁴⁸ France has the second largest budget in the EU. Until the end of the 1990s, French defense industry policy was based on high state control and ownership of firms. At the end of the 1990s, privatization of French firms began and France started putting more emphasis on collective defense industry policy for the EU. "This policy is based on a principle of competitive autonomy relying on domestic suppliers but also on European capabilities." France played a significant role in creating today's European collaborative programs and the development of Europe's new armament policy, the "Joint Armament Cooperation Office (OCCAR)," which aims at restructuring the defense industry in Europe. The A-400M transport aircraft, Tiger and NH 90 Helicopters, Multi-Mission frigate, Meteor and Aster missiles, and earth observation satellites are some of the programs that are being developed under OCCAR.⁴⁹ French politicians, especially at the ministry level, play an important role in assisting defense companies in finding customers around the world. For example, in his latest tour to Persian Gulf countries, French President Nicolas Sarkozy signed several agreements for French defense industry products.⁵⁰

⁴⁶ Jocelyn Mawdsley and Michael Brzoska, "Procurement, Arms Exports and Industrial Offsets in Britain and Germany," *Arms Trade Offsets: Theory, Policy, and Case Studies*, London, Routledge, 2004, 111.

⁴⁷ *Defense Systems Management College*, "A Comparison Of The Defense Acquisition Systems Of France, United Kingdom, Germany And The United States," 3-16. <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).

⁴⁸ *Defense Systems Management College*, "A Comparison Of The Defense Acquisition Systems Of France, United Kingdom, Germany And The United States," 3-20. <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).

⁴⁹ Patric Auroy, "The French approach to a European defense industrial base" (*European Affairs* Publication June 2007).

⁵⁰ *Aviation Week & Space Technology*, "Sarkozy Moves to Push French Exports," Vol. 167, December 17, 2007.

E. DEFENSE INDUSTRY DEVELOPMENT MODELS OF SECOND-TIER COUNTRIES

Countries have many incentives or reasons to develop their own defense industry. These reasons may include seeking an independent defense capacity, providing employment to citizens, driving the country's economic development, and spurring the growth of new industries and new technologies.⁵¹ For example, for the U.S., the most important incentive for having a domestic defense industry is National Security concerns; for Israel, as an island in the Arabian Sea, their defense industry is the means to a sustainable existence in this region; for Turkey, both sovereignty and having an independent foreign policy depend heavily on the defense industry.

Although there are several reasons behind having a domestic or national defense industry, the most important reason is having an independent defense capacity. In order to sustain sovereignty, a country needs a reliable source of defense capacity and usually the most reliable one is a domestic defense industry.

All countries follow similar paths to developing their own defense industry. Bitzinger compiled a list of four common models.⁵²

Model 1⁵³

- 1- Overhaul and service of imported weapons
- 2- Licensed assembly of foreign weapons
- 3- Manufacture of less complex components
- 4- Increasing local design and manufacture of components
- 5- Independent R&D and production

⁵¹Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 11-15.

⁵² Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 16-17.

⁵³ James Everett Katz, *Arms Production in Developing Countries* (Lexington Books 1984), 9.

Model 2⁵⁴

- 1- Initial import of arms from foreign suppliers
- 2- Maintenance and overhaul of important weapons, including the manufacture of spare parts.
- 3- Local assembly of imported subassemblies
- 4- Limited local component manufacturing; local licensed assembly
- 5- Some indigenous design and production, but important components imported
- 6- Local licensed production of less advanced arms
- 7- Local licensed production for most weapons; limited indigenous R&D and production of less advanced weapons
- 8- Indigenous design, development and production of weapon systems

Model 3⁵⁵

- 1- Capability to perform simple maintenance
- 2- Overhaul, refurbishment and rudimentary modification capability
- 3- Assembly of imported components, simple licensed production
- 4- Local production of components or raw materials
- 5- Final assembly of less sophisticated weapons; some local components production
- 6- Co-production or complete licensed production of less sophisticated weapons
- 7- Limited R&D improvements to local licensed produced arms
- 8- Limited independent production of less complicated weapons
- 9- Independent R&D and production of less sophisticated weapons
- 10- Independent R&D and production of advanced arms with foreign components
- 11- Completely independent R&D and production

⁵⁴ Janne Nolan, *Military industry in Taiwan and South Korea* (Palgrave Macmillan, 1986), 45-46.

⁵⁵ Keith Krause, *Arms and the State: Patterns of Military Production and Trade* (Cambridge University Press 1992), 170.

Model 4⁵⁶

- 1- Servicing and repair of imported weapon systems
- 2- Overhaul of imported weapon systems
- 3- Local assembly of imported subassemblies
- 4- Limited licensed production; assembly with some local components
- 5- Some independent licensed production but important components are imported
- 6- Local licensed production for most weapons; limited R&D on improvements and derivatives
- 7- Limited R&D and production for advanced arms; R&D and production for less advanced arms
- 8- Complete independence in R&D and production

Although there are different steps in these models, developing a defense industry is a process that starts with maintenance and repair of imported systems and continues towards independent R&D and production; from extreme reliance on imported products to independent production. Initial armament production tends to rely heavily on imported technical assistance from countries having developed defense industries. The next step usually consists of the licensed production of foreign weapon systems. This is usually followed by limited indigenous development and production of relatively small armaments. These basic capabilities are supplemented by incremental improvements by R&D. Lastly, a country may attempt to design and develop its own advanced systems such as tanks, fighter aircraft, missiles etc. This process has been repeated over and over again in the case of the second- tier arms producing states.⁵⁷

R&D has special importance in every model and without R&D, industry development and independence cannot be achieved. Excepting a couple of countries such as Sweden or Japan, “Defense industrialization has failed to help second-tier arms producers attain an advanced level of *independent* military-technological innovation and development.”⁵⁸ Analysis of these countries shows that limited or underdeveloped R&D

⁵⁶ Michael Green, “Arming Japan: Defense Production, Alliance Politics and Postwar Search for Autonomy,” *Asian Studies Review*, 24 1, 125-127.

⁵⁷ Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 27.

⁵⁸ Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 27.

bases are the primary reason for this failure. Secondary reasons are “shortages of skilled personnel” and lack of scientific and technical infrastructures needed for innovative technology development.⁵⁹

F. SUMMARY

This chapter provided a brief overview about the current trends in defense spending and the defense market. The peace dividend after the Cold War era ended in 2001. Defense spending started increasing after 2001 all over the world, due to high concerns about security. The U.S. has had the biggest role in this increase and U.S. spending constitutes 48% of world defense spending. The biggest increase since 1998 belonged to Eastern Europe, with 162%, followed by the Middle East with 62%.

The structure of the defense market reflects the defense industry power of countries. The defense market is mostly dominated by U.S. companies, and the U.S. has 7 companies in the Top 10 defense contractors list and 45 companies in the Top 100 defense contractors list. The U.S. is followed by the UK, with 1 company in the Top 10 list and 10 companies in the Top 100 defense contractors list. In the Top 10 defense contractors list, the companies other than the U.S. belonged to European countries. Turkey had only one firm in the Top 100 list that ranked 86th. Although defense spending and demand for defense systems increased during the last decade, it was not enough to prevent mergers and acquisitions. Company consolidations with mergers and acquisitions continued throughout the last decade. Defense industry companies responded to the competition requirements and increasing cost of defense systems by consolidating their powers.

This chapter also provided a brief overview of the policies of major players in the defense market. The U.S., as the biggest player in the defense market, owes its defense industry prosperity mostly to the Cold War era and the government’s emphasis on R&D. Sustaining their industrial base is the biggest challenge for the U.S. defense industry today. The U.S. strictly controls industry exports. Although offsets are used as a tool to boost defense industry exports, they are not a preferable method for federal governments,

⁵⁹ Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 27.

because they are detrimental for both transparency of competitive market and world trade.

Developing a collective defense and defense industry is the biggest challenge for the European Union and will likely continue being in the near future. Although some organizations were established to enhance European procurement cooperation, so far, their success has been limited to a couple of programs. The important points that come into prominence in European countries are: defense companies' emphasis on R&D, more than state governments; high offset requirements in procurements, such as 100%; political support, especially at the ministry level, for defense industry exports; and reluctance of the biggest countries in Europe, such as France and Germany, to give up their own defense industrial bases and to put less emphasis on domestic production, which makes collaborative defense industry efforts unsuccessful.

Finally, this chapter provided a brief overview about the defense industry developments of second-tier countries. Each country has different motives behind the desire to have their own defense industry. However, for the most part, the main reason is to have an independent defense capacity. Most second-tier countries have followed similar paths, starting with maintenance and repair of imported systems and continuing towards independent R&D and production; from extreme reliance on imported products to independent production. The most recent studies have shown that, except for a couple of countries, most second-tier countries have failed in their industry development efforts because of limited R&D or underdeveloped technology bases. Shortages of skilled personnel and technology structure needed for innovative technology developments were the main reasons for these failures.

III. DEFENSE SYSTEMS ACQUISITION POLICY OF TURKEY

A. INTRODUCTION

This chapter gives an overview of the historical development of the Turkish defense industry and the reasons to pursue a domestic defense industry. This chapter also provides background information about defense systems acquisition policy and sub-policies, financial resources of Turkish defense spending, and the structure of the Turkish defense industry.

This chapter primarily answers the question: “What is Turkey’s defense systems acquisition policy?” The other research questions explored in this chapter are: “Why is a domestic defense industry important for Turkey?”, “What are the financial resources of defense spending?”, and “How is the Turkish defense industry structured?”

The first topic explained in this chapter is the historical development of the Turkish defense industry. Historical developments are important, because they show the reasons behind the desire for a domestic defense industry. In addition to all countries’ domestic defense industry desires, Turkey has unique reasons that make this effort a must.

The second topic explained in this chapter is Turkey’s defense systems acquisition policy. Defense systems acquisition policy can be defined as the path and means used by the Turkish government for acquiring goods and services. This policy includes several sub-policies that support achieving the objectives.

The third topic explained in this chapter is Turkish defense industry structure. This explanation is given from different perspectives, such as ownership and activity fields.

The last topic explained in this chapter is the financial resources of the defense industry. This explanation provides background about the complexity of defense spending in Turkey and the reason behind non-transparent budget accounts.

B. THE HISTORY OF THE TURKISH DEFENSE INDUSTRY

The history of the Turkish defense industry goes back to the Ottoman Empire. Until the 17th century, the Ottoman Empire was a superpower and was leading military technology. But with the Industrial Revolution in the 18th century, the Ottoman Empire lost track of technological developments and Europe took the lead in the military industry.

After the First World War, Turkey had to close all their military facilities because of the Mondros Ceasefire Agreement. After the Turkish Independence War (1919-1923), serious attempts were made to establish a national defense.⁶⁰ Establishing a national defense industry was the most important priority for the founder of the Turkish Republic, Mustafa Kemal Atatürk, and he worked hard to achieve this goal. The industry started manufacturing national products for the Turkish Armed Forces at this time and continued until the Second World War.

In 1924, maintenance and repair facilities for small arms / guns and ammunition were established in Ankara. Following this, we see a new ammunition production plant in 1927, brass production facility in 1928, Kayaş primer factory in 1930, Kırıkkale electrical plant and steel factory in 1931, gunpowder, rifle and artillery gun factory in 1936, and Mamak gas mask plant in 1943.⁶¹

During World War II, the defense industry focused on the urgent needs of the armed forces, such as maintenance, ammunition, flame throwers, anti-tank ammunition, artillery ammunition, etc. The economic crisis caused by the Second World War deeply affected both the Turkish economy and the defense industry. Some of the military factories were closed during this time and others came to the stopping point.⁶²

⁶⁰ Husnu Ozlu, "Turkish Defense Industry after Second World War" (PhD diss.Dokuz Eylul University 2006), 6.

⁶¹ Turkish Defense Industry Manufacturers Association, Official website. <http://www.sasad.org.tr/sub.asp?tnm=TARİHCE> (Accessed November 20, 2008).

⁶² Husnu Ozlu, "Turkish Defense Industry after Second World War" (PhD diss.Dokuz Eylul University 2006), 6.

Between 1950 and 1960, “[f]oreign military aid that started upon Turkey’s membership in NATO and increased initially, but within a short period stalled the development of local defense industry which was at its preliminary stage of formation. Instead of improving the local defense industry, foreign aid and foreign procurement were practiced during this period. Because of the Cold War and military and political polarization after the Second World War, Turkey met its defense requirements through the framework of NATO.”⁶³

Turkey’s Peace Operation to Cyprus in 1974 was an important event for the Turkish defense industry. A U.S. arms embargo imposed in Turkey showed the importance of national defense. This event accelerated the establishment of new government-supported enterprises, such as ASELSAN (1975), İŞBİR (1979), ASPİLSAN (1981), and HAVELSAN (1982).

The 1980s were the reorganization period for the Turkish defense industry. “The first step in this direction was taken by the establishment of defense equipment Directorate as a state enterprise. However, the shortcomings stemming from its state-bound status prevented its success and all the properties of that enterprise were transferred to the Under-secretariat for Defense Industries (SSM) which was established in 1985 under the Law No: 3238.”⁶⁴ During this period, big defense industry projects such as the F-16 (1987), the Armored Personnel Carrier (1988), the Mobile Radar Complex (1990), Electronic Warfare Equipment for F-16, HF/SSB Radios, and the CASA Light Transport Aircraft (1991) started. A number of defense industry companies were established with foreign capital contributions, such as TAI (1984), TEI (1985), MIKES (1987), FNSS (1988), MARCONI KOMÜNİKASYON (1989), and THOMSON – TEKFEN RADAR (1990) to carry out the new projects.

⁶³ Undersecretariat for Defense Industries, Official Website.
<http://www.ssm.gov.tr/EN/savunmasanayimimiz/Pages/Tarihce.aspx> (Accessed November 20, 2008).

⁶⁴ Undersecretariat for Defense Industries, Official Website.
<http://www.ssm.gov.tr/EN/savunmasanayimimiz/Pages/Tarihce.aspx> (Accessed November 20, 2008).

In 1980s, a number of industrial private enterprises previously established for non-defence production, such as OTOKAR, MERCEDES, BMC, NUROL MAKİNA organised production lines for defence products and some companies such as ROKETSAN (1989) were formed by as private enterprises.⁶⁵

In 1987, the Foundation of Strengthening Turkish Armed Forces (Turk Silahlı Kuvvetlerini Güçlendirme Vakfı, or TSGV) was established and foreign shares in some companies mentioned above were bought by this foundation.

In 1998, the Ministry of National Defense published the Defense Industry Politics and Strategy Document (Türk Savunma Sanayii Politikası ve Stratejisi, or TDIPS) which contained the government directive for the defense industry. This document redefined and restructured the framework of the Turkish defense systems acquisition policy.

C. THE IMPORTANCE OF TURKEY HAVING ITS OWN DEFENSE INDUSTRY

As a member of NATO, Turkey has the second largest armed forces following the U.S. This is primarily due to its geopolitical importance as a member of NATO and its strategic location in three main regions of crisis: the Balkans, the Caucasus, and the Middle East. Although there are ongoing efforts for this number to be reduced, the Turkish armed forces still rank among the 10 largest armies of the world, with others including the U.S., China, and India. The Turkish army in 2007 was made up of 402,000 personnel, with the sheer size of the army posing various challenges for the military. The navy and air force are only a sixth of the size of the army, at 52,750 and 60,100, respectively.⁶⁶

Although the Cold War ended at the beginning of the 1990s, security problems, military conflicts among nations, and terrorist attacks maintained the need for the defense industry and arms production. International relations are subject to uncertainty and it is

⁶⁵ Turkish Defense Industry Manufacturers Association, Official website. <http://www.sasad.org.tr/sub.asp?tnm=TARİHCE> (Accessed November 20, 2008).

⁶⁶ *Business Monitor*, "Turkey Defense & Security Report Q3 2008, Military Structure and Defense Industry", 34.

never clear what will happen tomorrow. Because of this uncertainty, states throughout the world must be ready for involvement in conflicts, for terrorist attacks, and unpredictable situations in general.

In order to cope with these problems, every country pursues a variety of policies. Some put more emphasis on domestic arms production, while others buy from different countries.⁶⁷ This choice includes a serious tradeoff among resources and choosing a domestic or national defense industry includes a big opportunity cost. It requires huge investment to establish and a lot of money to sustain.

Depending on foreign countries for national defense may cause serious problems in a conflict. Countries that you depend on may control their weapons according to their political reasoning and may not allow you to use them. In such a situation, money is not enough to buy a weapon system. “In order to defend its territory satisfactorily, a nation state requires a reliable source of armaments, and the most reliable one is generally a domestic one.”⁶⁸

In addition to the common reasons for developing a domestic defense industry, Turkey has three major unique reasons for developing its own industry. The first reason is experience learned from history, the second is terrorist attacks that occur in Turkey’s Southeast regions, and the third is its geographical and strategic position and nearness to conflict zones.

Turkey encountered problems as a result of not having its own defense industry twice in its history. The first one was in 1974, during the Cyprus Peace Operation, and the other one was in 1993, when Germany placed an embargo on using arms against terrorists. The first embargo affected Turkey seriously, because Turkey had too heavily depended on the U.S., and most of their weapons and equipment were either from U.S. aid or procured from the U.S. in other ways. The second embargo did not have a serious

⁶⁷ Efraim Inbar and Benzion Zinberfarb, *The Politics and Economics of Defense Industries* (Frank Cass Publishers 1998), 13.

⁶⁸ Richard A Bitzinger, *Towards a Brave new Arms Industry* (Oxford University Press 2003), 11.

effect on the Turkish Armed Forces (TAF) because there were only a limited number of arms subject to this embargo in the TAF. However, the lesson gained from this embargo was clear: Turkey must have its national defense industry.

Fighting with terrorists since 1984 is another reason for Turkey's defense industry development efforts. The never-ending fight, changing fighting techniques, and the need for new equipment based on new requirements made defense industry development a high priority for Turkey. At the beginning of this fight, common belief was that the terrorist problem would be cleaned up in a short time, and for this reason, defense needs were considered urgent, and they were fulfilled from foreign suppliers. After realizing that too much money had gone abroad and no value had been added to the domestic defense industry because of these urgent procurements, new efforts to fulfill these needs from domestic resources were taken. Some Turkish companies, such as ASELSAN and HAVELSAN, developed electronic systems, and OTOKAR developed Cobra, a light, wheeled armored vehicle, in order to meet the requirements of Turkey's conflicts with terrorists. But these efforts were not enough for a country fighting with terrorists for more than two decades. Fighting with terrorists was not the epicenter of developing a domestic defense industry. For example, mine threats and remote-controlled explosives were not a new technique for Turkey, but have been used for a long time; however, nothing was developed by the Turkish defense industry to be used against this threat until this year. After seeing the U.S. commercial-off-the-shelf (COTS) solution to its existing problems in Iraq and Afghanistan, BMC (British Motor Corporation) Company started developing the Turkish version of MRAPs (Mine Resistant Ambush Protected) in 2007.⁶⁹ Another example is UAVs (Unmanned Aerial Vehicles), which are currently the best tool to control remote areas and borders. Terrorists have been using mountainous and remote areas since 1984 and nothing was developed domestically to control these areas. Finally, last year, three Herons (a type of UAVs) were bought from Israel and an agreement was made to buy seven more in following years at a cost of \$183 million.

⁶⁹ *Haberturk*, news release. <http://www.haberturk.com/haber.asp?id=45618&cat=110&dt=2007/11/27> (Accessed January 10, 2009).

Turkey's strategic position and nearness to conflict zones is the final major reason for the importance of Turkey developing its own defense industry. Turkey is geographically in the middle of most of today's and previous years' conflict zones. It is located between Europe and Asia, and its neighbors are Iran, Iraq, the Republic of Georgia, and Armenia in Asia, and Greece and Bulgaria in Europe. The history and current status of these countries prove that a conflict can very suddenly erupt in this region. The Iran-Iraq war during the 1980s, the U.S.' Operation Freedom of Iraq in 2003, the clash between Russia and Georgia in 2008, and never-ending disputes between Turkey and Greece over the Aegean Sea are some examples of these conflicts. Surviving in this region, and sustaining independent foreign policy based on national interests, depends heavily on an independent defense capability that can develop modern equipment, tools, and devices.

D. DEFENSE SYSTEMS ACQUISITION POLICY OF TURKEY

Defense systems acquisition policy is defined in this thesis as the path and means used by the Turkish government for acquiring goods and services. The objective of this policy is to create a sound domestic defense industry that can satisfy government needs. The means or sub-policies that are used to support this objective can be listed as industry policy, export policy, R&D policy, and offset policy.

In Turkey's defense systems acquisition process, the following institutions have the following roles and responsibilities: the Council of Ministers decides the general strategy; the Defense Industry High Coordination Board is responsible for guiding directives; the Defense Industry Executive Committee is responsible for decision-making; the Turkish General Staff is responsible for requirement generation; the MND (Ministry of National Defense) and Undersecretariat for Defense Industries are responsible for implementation, industrialization, procurement, export, and finance; the

Defense Industry Audit Board is responsible for auditing and control; and universities, research centers, and companies are responsible for design, production, manufacturing, and R&D.⁷⁰

As mentioned in previous pages, two resolutions structured the baseline of Turkey's defense systems acquisition policy and defense industry development efforts. The first one is Law number 3238, about the establishment of the Undersecretariat for Defense Industries, and the second one is Resolution number 23378, which is titled "The Principles of Turkish Defense Industry Policy and Strategy."

1. Law Number 3238

Although Turkey has faced many problems as a result of not having a domestic defense industry, there was not any serious attempt to develop such an industry until Law number 3238 in 1985. The basic structure of the defense industry until that time was that state-dominated and private firms were prohibited from entering the defense market. In 1985, the Undersecretariat for Defense Industries was established under Law number 3238. This law introduced new principles to the defense industry, of which, the main principles were as follows:

- "To make maximum use of Turkey's existing industrial capabilities and potential,
- To provide direction and assistance to new investments that contain high technology,
- To incorporate foreign technologies and to render possible contributions by foreign capital,
- To encourage research & development activities."⁷¹

⁷⁰ Secretariat General for EU Affairs, Official website.
http://www.abgs.gov.tr/tarama/tarama_files/20/SC20DET_DEFENCE.pdf (Accessed December 20, 2008).

⁷¹ Undersecretariat for Defense Industries, Official website.
<http://www.ssm.gov.tr/EN/savunmasanayiimiz/Pages/Tarihce.aspx> (Accessed December 5, 2008).

The basic objectives of this law were to structure a modern defense industry by using efficient administrative mechanisms, by using constant cash flows, and by having defense needs met from domestic suppliers to the fullest possible extent.

In addition to the Undersecretariat for Defense Industries, this law also established the Defense Industry Support Fund, the Defense Industry Executive Committee, and the Defense Industry Support Fund.⁷²

a. Defense Industry Executive Committee

The Defense Industry Executive Committee is the main body of the decision-making process for critical defense-industry-related issues and major defense systems procurement decisions. The Prime Minister is the head of this committee, and the General Chief of Staff and the Minister of National Defense are the other members.

b. Undersecretariat for Defense Industries and Its Role

The mission and primary objective of the Undersecretariat for Defense Industries is to put into practice the decisions of the Executive Committee. In order to achieve this objective, a special legal basis, special budget and financial resources are provided to SSM.(Savunma Sanayi Mustesarligi - Undersecretariat for Defense Industries) The missions and tasks are defined as follows:

Putting into effect the decisions taken by the Defense Industry Executive Committee,

To reorganize existing Turkish Industry in line with the prerequisites of defense industry,

To plan the production of modern arms and equipment at private and public sector entities,

To realize research and development of modern arms and equipment, to have their prototypes built, to make advance payments, plan advance orders and determine other financial and economic supports,

⁷² Law No:3238 ratified by Turkish Parliament in 1985.

To coordinate export and offset trade issues relating to defense industry products.⁷³

The SSM is carrying out billion-dollar projects and its procurement strategy can be listed as “Domestic Production,” which is given the highest priority, under “Joint Development and Consortium” and “COTS (commercial-off-the-shelf) and Joint Procurement.”⁷⁴

c. Defense Industry Support Fund

The Defense Industry Support Fund is a unique fund provided for the SSM to carry out its mission. What makes this fund special is its high flexibility and bureaucracy-free structure. It provides constant cash flow to the SSM with full and independent control. Main incomes of this fund are:

Allotments from corporate taxes,

Fees and levies imposed on alcoholic and tobacco products, and all forms of chance games and betting, the lottery, etc.

This fund has a special meaning for both the defense industry and acquisition officials. It supplements the Ministry of National Defense Budget with millions of dollars on procurements accounts. Since its establishment in 1986, 80% of \$11 billion was spent on domestic production, 16% on direct procurement projects and 4% on the Advanced Technology Industrial Park (ATIP) Project.⁷⁵

2. Resolution Number 23378

Resolution number 23378 is the most important document to help shape Turkey’s defense systems acquisition policy, because it clearly defines the objectives and sub-policies to support and achieve these objectives. The Defense Industry Policy and

⁷³ Undersecretariat for Defense Industries, Official website.
<http://www.ssm.gov.tr/EN/kurumsal/Pages/3238SayiliKanun.aspx> (Accessed December 20, 2008).

⁷⁴ Murad Bayar, Undersecretary for Defense Industries (SSM), A Globus Vision Exclusive Interview *Capital Magazine*, June 2008.

⁷⁵ Undersecretariat for Defense Industries, Official Website.
<http://www.ssm.gov.tr/EN/kurumsal/Pages/3238SayiliKanun.aspx> (Accessed December 20, 2008).

Strategy Document (TDIPS-Türk Savunma Sanayii Politikası ve Stratejisi) was approved by the Council of Ministers in 1998. Although this law has been supplemented by several laws and regulations since 1998, it still serves as the basis for defense industry policy.

The objective of this resolution is to satisfy the needs of the Turkish Armed Forces (TAF) from national and domestic resources to the fullest possible extent. This Policy document includes the ways and principles of developing a national defense industry.

In this Policy document, the defense industry is differentiated from other industries by the following special characteristics:

- Sensitive manufacturing techniques, depending upon high technology structure,
- Special quality standards,
- Skilled and experienced workforce,
- Big investment requirements and high dependency on R&D activities,
- Only one buyer and limited demand-based production
- Openness to foreign markets to sustain continuous production, and
- Security and secrecy requirements.

Because of previous reasons, the defense industry requires close control and support of the government.⁷⁶

Turkish defense industry policy objectives are defined in this document as follows:

The Turkish defense industry must:

- Be open to domestic and foreign companies,
- Be dynamically structured,
- Be adaptable to new technologies and capable of developing new technologies,

⁷⁶ The Principles of the Defense Industry Policy and Strategy, ratified in 1998. <http://www.msb.gov.tr/Birimler/GNPP/html/pdf/p10c1.pdf> (Accessed December 10, 2008).

- Be powerful enough to compete in the world defense market and have export potential,
- Be capable of renewing own technology structure,
- Be able to cooperate with friendly and allied countries,
- Exploit existing industry potential and be exempt from duplications,
- Possess alternative industry fields, and
- Possess concrete infrastructure.

This policy document defines the following strategies and means required to achieve the objectives of defense industry policy: defense industry strategy, weapon systems classification strategy, export strategy, R&D strategy, and offset strategy.

a. Defense Industry Strategy

The Turkish National Defense Industry Strategy is based on several factors. In order to provide national security and to meet the needs of the Turkish Armed Forces securely and in a consistent manner, the national defense industry must be encouraged and supported by the government, and defense systems requiring high technology must be produced inside the country. To achieve this objective, the government must assist defense industry firms to establish manufacturing facilities with satisfactory technology structure. “The goal of technology acquisition is the primary objective at the center of this industrial model. It is aimed that the technologies should be classified and according to these classifications, principles of supply should be formulated such that technology shall be acquired and then domesticated and improved, becoming a part of the supply process.”⁷³

The Ministry of National Defense (MND) is the coordinating authority to perform this strategy. The MND should coordinate the points mentioned in this document with essential government agencies, defense industry firms, universities, and the Ministry of Foreign Affairs to exercise this policy according to international agreements.

b. Weapon Systems Classification Strategy

Since satisfying all the needs of the TAF from domestic sources is not feasible or economical, defense systems are separated into three categories: Systems/Technologies that have to be national, projected to be developed inside the country in the long run; Critical Systems/Technologies, that are projected to be developed inside if possible, and if not, must be developed with joint production; and Other Systems, projected to be procured from the sources that provide the lowest life cycle cost and best quality based on multiple source acquisition policy. The list of these system categories is determined by the Ministry of National Defense and updated according to the needs of the TAF.

According to this document, “having appropriate national classified facility security document” is a must for the systems that have to be national. If this is not possible, a subcontractor and main contractor application is used. The companies that do not have this clearance can only be subcontractors. A main contractor must be a national firm and has the authority to choose subcontractors. For equipment procurements and system acquisitions, domestic firms always have priority. For the systems or equipment that will be procured from abroad, priority is given to the firms that provide direct or indirect offset applications to the domestic industry.

c. Export Strategy

In this document, export is considered an important means to providing a more rational production capacity, a foreign currency inflow mechanism, and a sustainable industrial base. All kinds of promotion and credit, within the limits of financial resources, are encouraged for friendly and allied countries eager to buy defense industry products. The promotion of the defense industry is made through a single channel and financial support is provided by the state.⁷⁷

⁷⁷Undersecretariat for Defense Industries, Official Website.
<http://www.msb.gov.tr/Birimler/GNPP/html/pdf/p10c1.pdf> (Accessed December 20, 2008).

⁷⁹Undersecretariat for Defense Industries, Official Website
<http://www.s.kurumsal/organizasyon/mstyrdsanayihizmetleri/dbskarge/Pages/default.aspx> (Accessed December 20, 2008).

d. R&D Strategy

According to TDIPS document, the responsibility to conduct R&D activities is under the coordination of the MND. The primary institution commissioned for this purpose is the SSM. The objectives of R&D policy are defined by the SSM as:

Expanding R&D activities in Turkish Industry, and consequently achieving high technology and developing a modern defense industry;

Directing current local R&D potential to intermediate and long range military requirements, first dealing with projects that will provide development of a local technology base and then using this base to acquire engineering development and manufacturing data package capabilities;

Promoting basic research projects, which can significantly contribute to the development of national technology in the near future and prototype development projects that will allow modernization or overhaul/maintenance of systems currently in service in the Turkish Armed Forces (TAF), and

Supporting and organizing multidisciplinary projects for the optimization of the capabilities of universities and R&D institutions, along with industry participation.⁷⁸

Early in the year 2000, in order to increase the domestic contribution rate, a new R&D policy, in addition to a new industry policy, was adopted by the SSM and announced to all universities, research institutions, and defense industry companies. The policy objectives were defined as: expanding R&D activities, directing current domestic R&D projects, promoting basic research projects and prototype development projects that would contribute to national technology in the near future, and supporting and organizing industry and institution participation in creating a modern defense industry.⁷⁹ The primary objective of this policy was to harmonize R&D activities to achieve the modern defense industry objective.

e. Offset Strategy

Offset directive and offset policy was stated in Law 3238 as:

Industrial participation/offset (ip/o): Within the scope of the projects, the transactions which will be executed to use the production potential and capabilities of local industry, to increase the competitiveness of the local industry in the international markets and to provide technological cooperation, investment and R&D opportunities are defined as industrial participation/offset.

The objectives of Turkey's offset policy can be listed as follows: "...to protect and improve the local defense industry, to provide transition flexibility for military and civil products, to contribute to the modernization of the technological infrastructure, to set possible grounds for the integration of local-foreign companies."⁸⁰

A new offset directive was approved in 2007, in order to increase the effectiveness of offset applications and increase the domestic share in procurement projects,. According to this directive, the new threshold for offsets is determined as being \$10 M, the offset obligation is determined as 50% of contract value, and the fulfillment period is determined as delivery plus two years. The category for indirect offset obligations, nondefense products and services, was removed from the offset directive. To increase exports, and to promote defense industry company shares in international markets, domestic defense industry company contracts were covered under offset in this new policy.⁸¹

The objectives of this policy are summarized by Mustafa Egeli, from HAVELSAN, as: "The SSM's mission under the industrial participation and offset directive 2007 is clear -- continued promotion and enhancement of the Turkish defense industry through quality, win-win offset programs. Prospective contractors will be

⁸⁰ Goknur Pilli, "SSM Presentation" (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24 2007).

⁸¹ Goknur Pilli, "SSM Presentation" (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24 2007).

required to guarantee work share, technology transfer, and/or strategic partnership with eligible Turkish companies under future defense programs as part of their offset commitments.”⁸²

E. FINANCIAL RESOURCES FOR DEFENSE EXPENDITURES

Turkey, as a member of NATO, does not have transparent defense spending. “The Ministry of National Defense (MND) budget is supplemented by the budgets for the Gendarmerie, Coast Guard, and Turkish Defense Industries Undersecretariat (SSM). MND spending accounts for around 70 per cent of the total budget, the Gendarmerie around 17 per cent and SSM procurement 10 to 12 per cent.”⁸³ Although the Ministry of National Defense has the biggest share of defense expenditures, it has many resources other than the MND budget. Financial resources for defense expenditures can be classified as follows:

- Allocated resources from Ministry of National Defense,
- Defense Industry Support Fund (DISF),
- Foundation of Strengthening Turkish Armed Forces,
- General Command of Gendarmerie Budget,
- Coast Guard Budget,
- International loans,
- Foreign military aids, and
- Other MND incomes.

According to a study conducted by Günlük-Şenesen, 1983-2001: personnel expenditure’s share consists of 40%, equipment’s share consists of 19%, and current expenditures consist of 38% of the MND budget.⁸⁴

⁸² Lale Sariibrahimoglu, “New Offset Policy to Boost Turkish Defense Exports,” *Today’s zaman*, May 28, 2007.

⁸³ *Jane's Defence*, “Budgets – Turkey” July 4, 2008.

⁸⁴ Gulay Gunluk-Senesen, “Türkiye’de Savunma Harcamaları ve Ekonomik Etkileri 1980-2001” (*TESEV publications* 2002), 57-58.

According to the same study, on average, the Army's share in the MND budget is 21.9%, the Air Force's share is 14.4%, the Navy's share is 7.7%, the Ministry of National Defense's share is 7.2%, and the General Chief of Staff's Share is 7.1%.

The Defense Industry Support Fund was established in 1985, under the control of the Turkish Central Bank, in order to structure a modern national defense industry that could compete with foreign defense companies. Furthermore, another objective of this fund is to provide stable resources for acquisitions, production, and modernization of defense systems, in addition to the general budget.⁸⁵ Another purpose of this fund is to encourage and support private firms, who are not eager to take part in the defense industry because of the uncertainty and risks involved, to enter into the defense industry. Revenue and corporation taxes, the National Lottery Share, the tax share on alcohol and gasoline consumption, the special consumption tax share, shares on bet games, international loans, and resources transferred from the MND budget are some of the revenues of this fund.⁸⁶

According to the 2007 SSM Activity Report, Defense Industries Support Fund (SSDF) income, mainly comprising revenues from the state-run lottery, reached \$2.459 billion in 2007, while \$1.581 billion of this amount was spent primarily for arms acquisition, including an amount earmarked for local development of defense systems as part of the Turkish policy aiming to increase the local content of military projects to reduce the reliance on main systems abroad to 50 percent by the end of 2011.⁸⁷

The Foundation of Strengthening Turkish Armed Forces (FSTAF) revenues include the profits gained from owned or shareholding companies, foundation facilities, and donations. Between 1987 and 2000, Turkey's defense expenditure consisted of 86% of the MND budget and 14% of FSTAF. Equipment expenditures in this period supplied 54% from the MND budget and 44% from the FSTAF.⁸⁸

⁸⁵ H. Karahan Turk, "Türk Savunma Sanayinin Ekonomik Etkileri Ve Savunma Harcamaları-Büyüme İlişkisinin Ekonometrik Modellenmesi" (Thesis diss. Cukurova University, 2007), 29.

⁸⁶ Undersecretariat for Defense Industries. www.ssm.gov.tr (Accessed December 20, 2008).

⁸⁷ Lale Sariibrahimoglu, "Turkey Spends More on Defense," *Today's Zaman*, Jan 16, 2009.

⁸⁸ Gulay Gunluk-Senesen, "Türkiye'de Savunma Harcamaları ve Ekonomik Etkileri 1980-2001" (TESEV publications 2002), 10.

Foreign Military aids primarily consist of the loans and aids granted by the U.S. This aid started in 1947, after the implementation of the Truman Doctrine, to develop the Turkish economy and to provide military self-reliance against the USSR's pervasion efforts. Since then, the U.S. has loaned and granted Turkey more than \$12.5 billion in economic aid and more than \$14 billion in military assistance.⁸⁹ This aid followed a decreasing path in the last decade and in 2002, U.S. military aid resumed with \$53.75 million being provided through Foreign Military Financing (FMF) and International Military Education (IMET) programs. In 2007, the U.S. provided \$170 million to Turkey.⁹⁰ The following table shows U.S. military aid since 2001 and forecasts until 2010.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
USD billions	0.02	0.54	0.2	0.4	0.37	0.18	0.17	0.1	0.12	n/a

Table 5. U.S. Military Aid to Turkey⁹¹

F. THE STRUCTURE OF THE TURKISH DEFENSE INDUSTRY

The Turkish defense industry can be divided into three major parts from the shareholders' perspective. The Turkish defense industry consists of government-owned companies, which constitute 31% of the industry; private companies, which constitute 36%; and association-owned companies (Foundation of Stenghtening Turkish Armed Forces, FSTAF), which constitute 33%. The following figure represents this distribution.⁹²

⁸⁹ U.S. Department of State, "Background Note: Turkey". <http://www.state.gov/r/pa/ei/bgn/3432.htm> (Accessed December 26, 2008).

⁹⁰ *Jane's Defence*, "Budgets – Turkey". July 4, 2008.

⁹¹ *Jane's Defence*, "Budgets – Turkey". July 4, 2008.

⁹² M.Kaya Yazgan, "Turkish Defense Industry with Numbers", May 2008, 3. www.sasad.org (Accessed December 23, 2008).

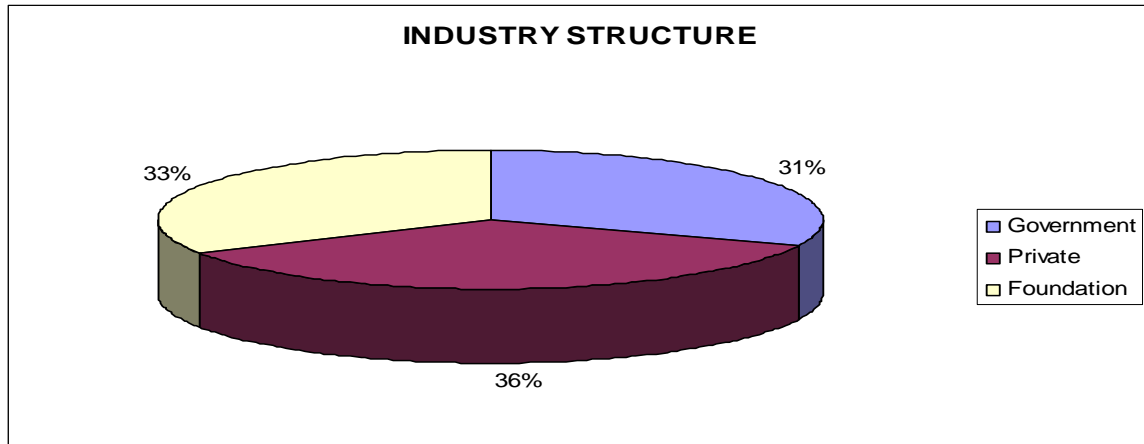


Figure 5. Industry Structure (Ownership)

The government-owned facilities are MKEK and plants owned by the TAF and MND; the TAFF (Turkish Armed Forces Foundation) owned companies are ASELSAN, TUSAS, HAVELSAN, ROKETSAN, ISBIR, and ASPILSAN; other companies are owned by private enterprises.

Another classification can be made based on their activity fields: The companies working on naval platforms constitute 23%; electronics, 22%; weapons, ammunition, rockets, and missiles, 14%; land platforms, 13%; aerospace, 11%; information technologies, 8%; uniforms, 5%; and other activity fields constitute 4% of the Turkish defense industry.⁹³

⁹³ M.Kaya Yazgan, "Turkish Defense Industry with Numbers," May 2008, 3. www.sasad.org (Accessed December 23, 2008).

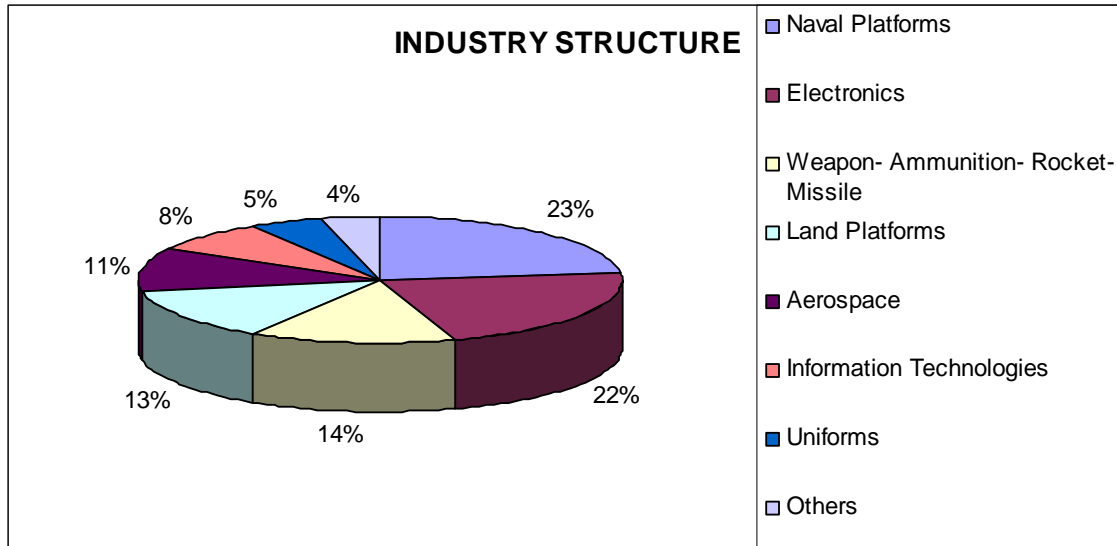


Figure 6. Industry Structure (Activity Field)⁹⁴

The other classification of private enterprises can be made based on capital source and share proportion. Nurol Makine, STFA, Savronik, Kale Kalıp, OTOKAR, and İbrahim Örs are examples of national private companies. TAI, TEİ and FNNS are examples of foreign participation.⁹⁵

The Turkish Armed Forces Foundation has a special value in the Turkish defense industry. This foundation has shares in most of the biggest companies. For example, it has shares in military software company HAVELSAN (97.9%), military electronics company ASELSAN (85.9%)⁹⁶, aerospace company TUSAS and ammunition and rocket company ROKETSAN (35.5%).

G. SUMMARY

This chapter provided a brief overview of the history of the Turkish defense industry and the reasons underlying Turkey's desire to develop their own defense

⁹⁴ M.Kaya Yazgan, "Turkish Defense Industry with Numbers," May 2008, 3. www.sasad.org (Accessed December 23, 2008).

⁹⁵ A.Mithat Kızıroğlu, "Savunma Sanayi Ve Özelleştirme Açısından Değerlendirilmesi" (Thesis diss. Halic University, 2007), 62.

⁹⁶ *Business Monitor*, "Defense Industry Analysis - Turkey", 2008, 5.

industry. Although the desire to develop a domestic defense industry is as old as the history of Turkish Republic, no serious attempts had been made until the beginning of the 1990s. The primary reason for this negligence was the foreign aid that Turkey received, which was intended to help protect their armed forces structure against the Soviet threat. However, this aid was treated as an opportunity to invest resources in areas other than defense, instead of enhancing the defense industrial base.

The primary reason for most countries exerting serious efforts towards structuring their own defense industry is the need for independent defense capability. In addition to reasons common to all countries for developing a domestic defense industry, Turkey has three major unique reasons for doing so. The first reason is experience learned from history, the second one is terrorist attacks in Turkey's Southeast regions, and the third one is its geographical and strategic position and nearness to conflict zones.

This chapter also provided a broad overview of Turkey's defense systems acquisition policy and strategies, in order to provide background about the variables that are used in the following chapter to measure the policy effects. All these policies and strategies are aimed at developing a defense industry that can satisfy government needs with the best quality. Since this objective cannot be achieved in a short period of time, the strategies are developed, as explained in second-tier industry development models, to reach the desired level in an orderly manner. The policy can be summarized as an order of precedence, domestic production, consortiums, joint production, and direct procurements with offset.

Similarly, this chapter provided an overview of the defense company structures and financial resources of Turkey. From the ownership perspective, the defense industry can be divided into three parts: government-owned companies, private companies, and foundation companies. From the activity field perspective, it is dominated by the companies working in the electronics field and naval platforms.

Financial resources of Turkish defense spending are very complicated; however, the structure and legal basis provided for the Defense Industry Support Fund provides the SSM, the main body of defense acquisitions, high flexibility and constant cash flow to be able to carry on its mission.

IV. ANALYSIS OF THE EFFECTS OF TURKEY'S DEFENSE SYSTEMS ACQUISITION POLICY ON THE DEFENSE INDUSTRY

A. INTRODUCTION

The purpose of this chapter is to analyze the effects of Turkey's defense policy on the defense industry. Financial variables of the defense industry, such as defense spending, defense industry sales, defense industry exports, the money allocated for R&D, offsets, and current acquisition program structures, are used as the primary variables to measure the effects of policy over a decade. In the first part of this chapter, regression analysis is conducted to find out the relationship, if any, between defense spending and industry sales.

In the second part of this chapter, deductive methodology is used to conduct an analysis of financial variables. Financial variables of major players in the defense market and of second-tier countries are used to provide a comparative baseline, and past data about selected financial variables are used to measure the relative position of the Turkish defense industry, among other defense industries.

In the third part of this chapter, the current structures of defense acquisition programs are analyzed to measure the extent of how the order of precedence of defense systems acquisition policy has structured today's acquisition programs.

In the last part of this chapter, future challenges of the defense industry are analyzed to give an overview of the possible threats and opportunities that must be considered and to make recommendations about the prospective challenges of defense systems acquisition policy.

This chapter answers the primary research question, "How did Turkey's defense systems acquisition policy affect the defense industry over a decade?" The other questions answered in this chapter are: "What is the relationship between defense spending and industry sales?", "How did this policy affect industry exports?", "How did

this policy affect money allocated for R&D?,” “How did this policy affect offset applications?,” “How did this policy affect the structure of current programs?,” and “What are the challenges of this policy?”

B. THE RELATIONSHIP BETWEEN DEFENSE SPENDING AND INDUSTRY

Defense spending or defense expenditure is the most important variable in analyzing government defense policy, because the amount of money spent on defense emphasizes its priority in a government budget. In other words, defense expenditure and where it is spent shows what is important from the government’s perspective and how the money allocated for this purpose is used. For this reason, the first part of this chapter analyzes the relationship between defense spending and defense industry sales to find out how government policy affected the defense industry.

1. Defense Spending of Turkey

As mentioned in Chapter III, Turkey’s defense spending is not very transparent. This is not only because of security reasons, but also because of the complexity of financial resources of defense spending. “MND budget is supplemented by the budgets for the Gendarmerie, Coast Guard and Undersecretariat for Turkish Defense Industries (SSM). MND spending accounts for around 70 per cent of the total budget, the Gendarmerie around 17 per cent and SSM procurement 10 to 12 per cent.”⁹⁷

Until the year 2000, Turkey’s defense spending had an increasing trend, while the world at large had a decreasing trend, and 2000 was the peak year for defense spending, both as a dollar amount and as a percent of the GDP. After that time, Turkey’s defense spending started decreasing. The biggest reason for this decrease was large budget cuts after the 2001 economic crisis. This crisis showed its effects mostly on the discretionary part of the Turkish budget, especially the defense budget. Another reason for this decrease is standby agreements with IMF. “Turkey pledged to the IMF in late December, 2000 that it would cut the military budget, one of the main sources of inflationary

⁹⁷ *Jane's Defense*, “Budgets – Turkey”, July 4, 2008.

pressures exerted upon the country's economy.” The years between 2002 and 2005 were recovery years for both the Turkish economy and defense spending, and 2006 was the beginning of a new increasing trend.⁹⁸

Comparing the following two charts shows that defense spending followed a similar path, with its share in the gross domestic product until 2008. In 2008, although the share of defense spending of the gross domestic product has a decreasing trend, defense spending has an increasing trend, which means that economic growth and the gross domestic product increase is greater than the increase in defense spending.

The following chart reflects Turkey’s defense spending over a 20-year period.

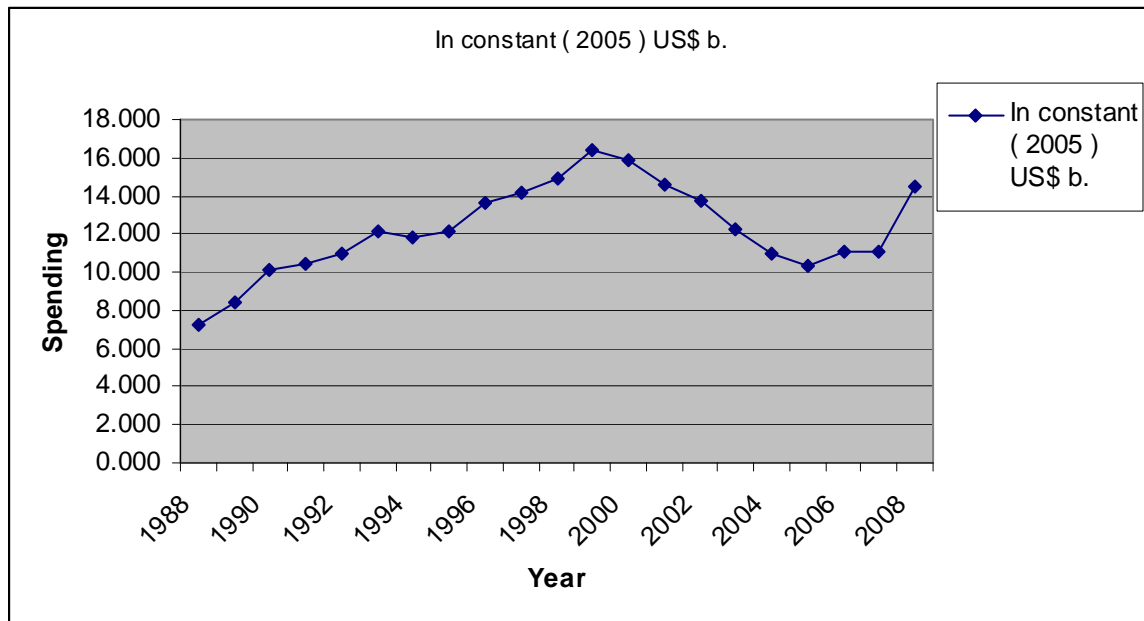


Figure 7. Defense Spending of Turkey 1988-2008⁹⁹

⁹⁸ Lale Sariibrahimoglu, “Turkey Spends More on Defense”, *Today’s Zaman*, January 16, 2009.

⁹⁹ SIPRI YEARBOOK 2008, “Armaments, Disarmament and International Security”.
<http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

The following chart reflects Turkey's defense spending as a percent of the GDP.

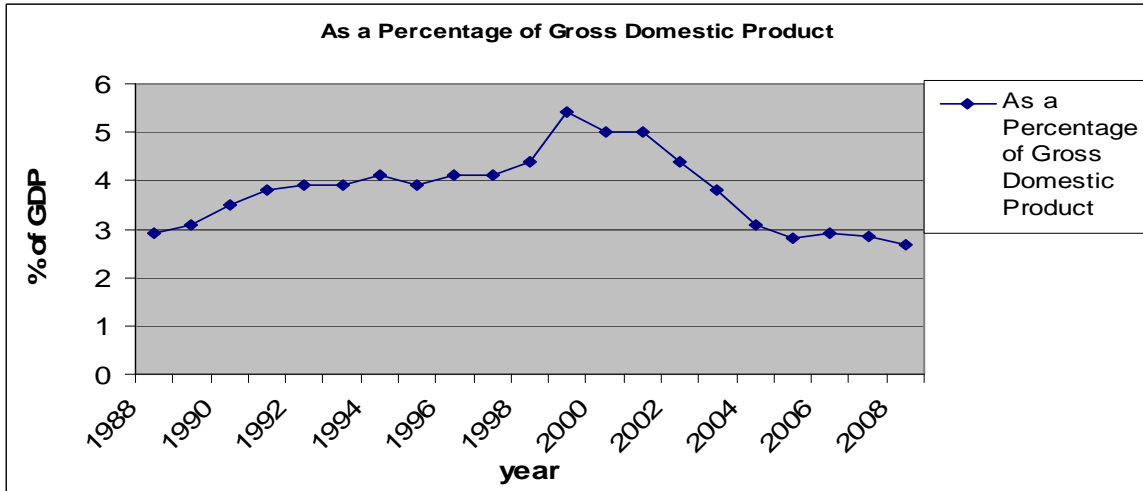


Figure 8. Defense Spending as a Percentage of the GDP 1988-2008¹⁰⁰

2. The Turkish Defense Industry with Numbers

Defense industry sales, exports, and R&D money are the main variables to analyze to measure the development of a defense industry. Turkish defense industry sales, beginning in 1997, had a decreasing trend until 2001, but after 2001, they started increasing and followed an increasing path with only slight deviations. In 1997, defense industry sales were \$1.205 billion and in 2007, they reached \$2.011 billion, with an increasing rate of 66% over 10 years. Comparing these numbers with the current status of developed countries such as the UK, Germany, and France, it is apparent that with this trend, it is almost impossible to catch these countries, from an industry power perspective. The sales of the United Kingdom's defense industry were \$42.4 billion in 2008; French defense industry sales were \$42.1 billion; and German defense industry sales were \$27.6 billion.¹⁰¹ Comparing Turkish defense industry sales with Israel, a second-tier country that started establishing domestic defense industry efforts around the

¹⁰⁰ SIPRI YEARBOOK 2008, "Armaments, Disarmament and International Security." <http://yearbook2008.sipri.org/files/SIPRIYB08summary.pdf> (Accessed December 20, 2008).

¹⁰¹ *Data monitor*, "Aerospace & Defense in Germany", December 2008.

same time as Turkey, it is apparent that even in 2015, with this trend, Turkey will not be able to reach the industry sales level of Israel. Israel's defense industry turnover was about \$7 billion in 2008.¹⁰² The following figure shows sales, exports, and money allocated for R&D in Turkey between 1997 and 2007.¹⁰³

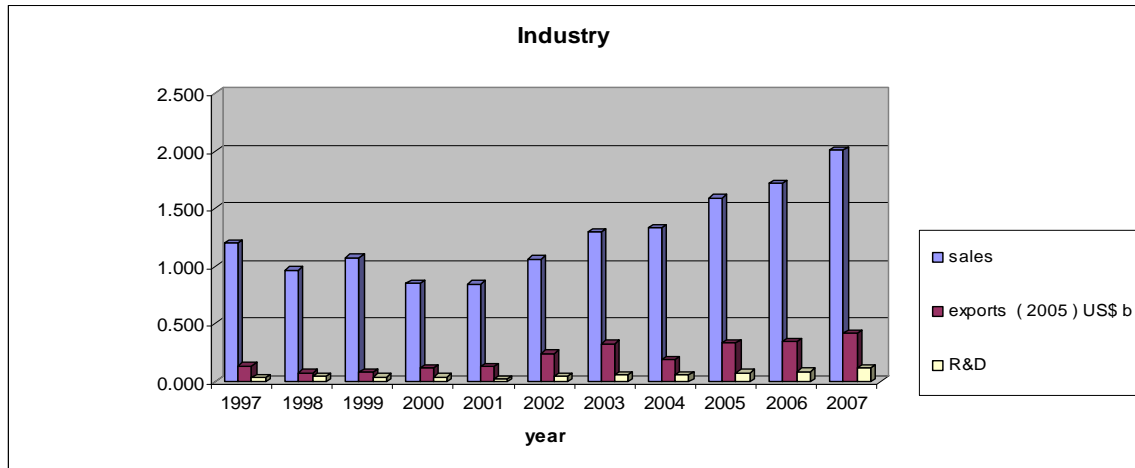


Figure 9. The Turkish Defense Industry with Numbers 1997-2007¹⁰⁴

3. The Relationship Between Defense Spending and the Defense Industry

In this part of the thesis, it is assumed that Turkey's defense spending will affect Turkish defense industry sales. Subsequent data from 1997-2007 was collected from the SASAD (Savunma Sanayi Imalatcilar Dernegi – Defense Industry Manufacturers Association) database (inflation adjusted) and analyzed to determine if any relationship exists between military expenditure and defense industry sales.

¹⁰² *Epicos*, Industry and Defense Portal, "A discussion with Joseph Ackerman, President and CEO of Elbit Systems, Israel's largest defense company," November 18, 2008.

¹⁰³ M.Kaya Yazgan, "Turkish Defense Industry with Numbers," May 2008, 3. www.sasad.org (Accessed December 23, 2008).

¹⁰⁴ M.Kaya Yazgan, "Turkish Defense Industry with Numbers," May 2008, 3. www.sasad.org (Accessed December 23, 2008).

In order to determine the relationship, if any, between these two variables, covariance and the coefficient of correlation were calculated. Covariance was calculated as -0.6694. Coefficient calculations showed that they were moving in the opposite direction. The advantage of coefficient correlation over covariance is having upper and lower limits (-1 and +1), and nearness to these limits shows the strength of the relationship. Coefficient correlation, which was - 0.8258, showed that there was a strong negative relationship between defense spending and industry sales. The following chart shows this negative relationship between these two variables.

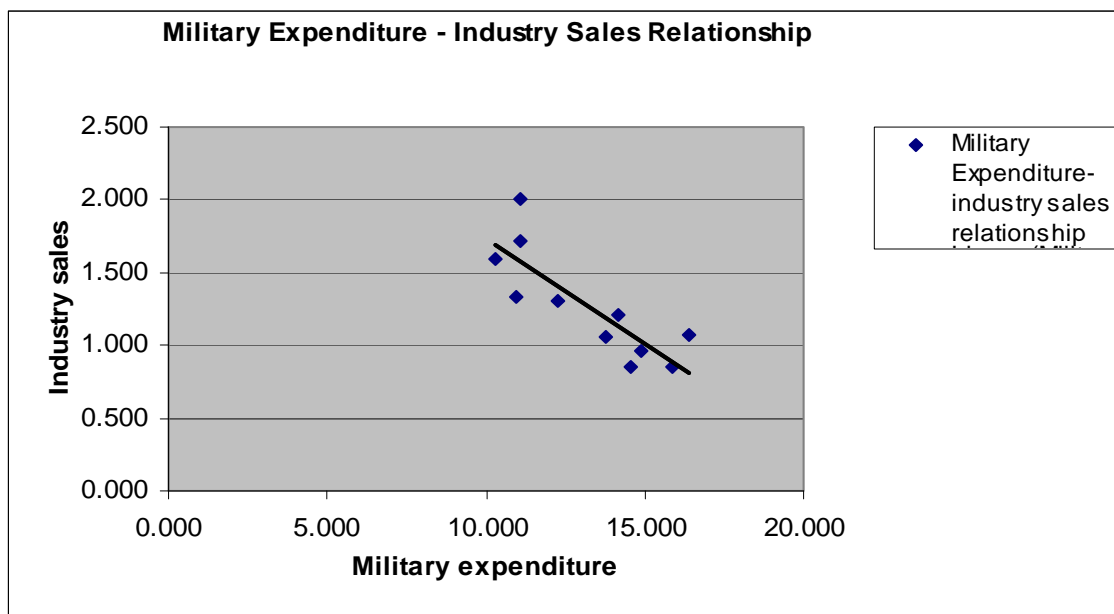


Figure 10. Defense Spending vs. Industry Sales

After finding out that there was a negative linear relationship between these two variables, a linear regression model was developed, based on the following: military expenditure was the independent variable and industry sales was the dependent variable. The objective of this model was to determine, based on historical data, how military expenditure has affected defense industry sales.

The output generated from this regression model is displayed in the following table. The least squares method was used to calculate the strength of this relationship. The least squares line is:

$$\text{Industry sales} = 3.15222 - 0.1424 \text{ Military expenditure}$$

Also, the following output represents this equation.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	3.15222777	0.433615072	7.269633783	4.7157E-05
Military Expenditure	-0.142415056	0.032419405	-4.392895411	0.00173822

Table 6. Regression Analysis

In this equation, the intercept is 3.152, meaning that if we extend the least squares line to 0, it would intersect the y-axis at 3.152. The slope of this line measures the marginal rate of change in the dependent variable. The slope is -0.1424, which means that for each unit increase in military expenditure, the marginal decrease in defense industry sales was 0.1424.

The following is the Excel output for regression analysis. The model can be assessed in three ways: standard error of estimate, the coefficient of determination, and the F test of the analysis of variance. The output shows that 68% of the variability (coefficient of determination- R square) in defense industry sales can be explained by defense spending. Standard error (0.2215) is judged according to the magnitude of the dependent variable. In this case, it is particularly small compared to the dependent variable (industry sales). The adjusted R square is calculated to avoid creating a false impression of a small sample size. In this model, the adjusted R square is 0.6466, indicating that however the coefficient of determination is measured, the model's fit is appropriate.

<i>Regression Statistics</i>	
Multiple R	0.82580327
R Square	0.681951041
Adjusted R Square	0.646612267
Standard Error	0.221522028
Observations	11

Table 7. Regression Statistics

The following is the Excel output for the anova table. In this table, a large value of F (19.297) indicates that most of the variation in industry sales is explained by the regression equation and the model is valid. Furthermore, the SSR (0.9469) is very large compared to the SSE (0.049), which signifies a good model.¹⁰⁵

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.946968565	0.946968565	19.2975301	0.001738223
Residual	9	0.441648078	0.049072009		
Total	10	1.388616644			

Table 8. Anova Table

Statistical analysis shows that there is a strong negative relationship between military expenditure of Turkey and their defense industry sales. The model found based on this analysis is: defense industry sales = 3.15222- 0.1424 military expenditure; meaning that each unit increase in military expenditure results with a 0.1424-unit decrease in defense industry sales. Although this statistical analysis shows a negative relationship, from a logical perspective, it is hard to sustain this relationship. How can industry sales increase while defense spending decreases? And what are the reasons for this negative relationship?

¹⁰⁵ Gerald Keller, *Statistics for Management and Economics* (Thomson South- Western Publications 2005), 200-380.

Assuming that everything is constant other than defense spending and industry sales, the relationship should be positive, because the defense market is a monopsony (many sellers but only one buyer). There is only one buyer and this buyer's spending should affect industry sales positively. Personnel expenditure of Turkey followed a decreasing trend until 2002 and followed a stable trend from then until 2007.¹⁰⁶ Operation and maintenance and procurement trends followed an increasing trend until 2007.¹⁰⁷ Based on these findings, this negative relationship can be explained by two reasons; the first is an increasing trend in exports, and the second is increasing trends in domestic purchases.

According to findings, increasing trends in defense industry exports is one factor that causes this negative relationship. The following table shows defense industry exports from 1997 to 2007. Data shows that industry exports had an increasing trend and the deviations from this trend were experienced in years: 1998, 1999, and 2004. The average export growth rate is 20%, compared to the industry sales average growth rate of 6%.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg. - Growth
Exports (b\$)	0.14	0.08	0.08	0.12	0.13	0.25	0.33	0.20	0.34	0.35	0.42	0.24
Growth (%)		-0.43	0.00	0.54	0.06	0.92	0.32	-0.41	0.73	0.03	0.20	0.20

Table 9. Defense Industry Exports

Increasing trends in the domestic contribution rate or meeting defense needs from domestic companies is another reason for the previously described negative relationship. There is only limited data about this, starting from 2005. In 2005, the percentage of Turkish Armed Forces purchases from domestic companies was 25%; in 2006, it was 36.7%; and in 2007, it was calculated as 41.6%. The objective in 2010 is 50%.¹⁰⁸ Based

¹⁰⁶ SIPRI, "NATO Military Expenditure on Personnel and Equipment, 1998–2007" SIPRI Yearbook 2008, appendix 5B.

¹⁰⁷ *Jane's Defense*, "Budgets – Turkey," July 4, 2008.

¹⁰⁸ Undersecretariat for Defense Industries, Official Website, "Activity Report 2007." <http://www.ssm.gov.tr/TR/dokumantasyon/Documents/2007%20Yılı%20Faaliyet%20Raporu1.pdf> (Accessed December 20, 2008).

on these findings, in spite of limited data, we can say that the domestic contribution rate in Turkey's defense spending is increasing, and this is another reason for the negative relationship between industry sales and defense spending.

Increasing the domestic contribution rate to develop an independent defense industry is the primary aim of Turkey's defense systems acquisition policy. Although the domestic contribution rate has an increasing trend, and the 2010 objective is achievable according to trend analysis, comparing these numbers with other countries shows that special emphasis is needed to reach the level of developed countries and achieve the primary objective of this policy. However, comparing numbers with other countries also shows that today's domestic contribution rate and the target rate in 2010 are both far behind the countries that have developed a domestic defense infrastructure. The domestic contribution rate in the U.S is 95%; in France, 90%; in Germany, 80%; in the United Kingdom, 85%; and in Israel, 79%.¹⁰⁹

C. FINANCIAL VARIABLES OF THE DEFENSE INDUSTRY

In this part of the thesis, policy effects on the defense industry are analyzed according to the following variables: industry exports, offset applications, the money allocated for R&D, and current acquisition programs.

1. Defense Industry Exports

Exports have special meaning for defense industries because domestic defense markets are too small to support a specialized production line. Limited domestic demand is not sufficient to maintain a production line forever. Also, it is not easy to establish a production line, and it requires huge investment and R&D. After producing the required number of tanks, a state cannot close a tank plant just because it will not need it anymore. Export is the only way to maintain production.

¹⁰⁹ Goknur Pili, "SSM Presentation" (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24 2007).

Another important point about exports is that they not only provide profit to a company, but they also help spread out the overhead burden of a production line, and economies of scale can be achieved only by producing more.¹¹⁰ Exports decrease the cost of a defense system by spreading out the overhead over an increased amount of production.

Despite including some political issues, allied countries may be preferred for importing defense systems, exports can be used to measure product quality, especially for major systems acquisitions. Major arms procurements are made for the long term, and in many cases, quality of the product is major evaluation criteria for the state. States do not want to spend a huge amount of money on useless systems, and exports around the world can show which systems are preferred by countries.

According to SIPRI data, Turkey was the 3rd largest recipient of major conventional weapons for the period 1998–2003, and the 9th largest for the period 2003–2007. It is clear that, when looking at its export rank, it does not occupy any of the highest positions. Turkey was, in fact, the 28th largest exporter for the period 2000–2004, and the 21st largest for the period 2006–2007. The following table shows the largest weapon exporters for the period 2006–2007.¹¹¹

SIPRI in US\$ m. at constant (1990) prices.				
Rank	Country	2006	2007	Total
1	USA	7821	7454	15275
2	Russia	6463	4588	11051
3	Germany (FRG)	2891	3395	6286
4	France	1586	2690	4276
5	Netherlands	1575	1355	2930
6	UK	978	1151	2128
7	Spain	825	529	1354
8	Italy	694	562	1257
9	China	562	355	917
10	Sweden	437	413	850
21	Turkey	56	33	89

Table 10. Largest Weapon Exporters 2006–2007

¹¹⁰ Richard A. Bitzinger, *Towards a Brave New Arms Industry* (Oxford University Press 2003), 83.

¹¹¹ SIPRI, http://www.sipri.org/contents/armstrad/at_db.html (Accessed December 20, 2008).

From the perspective of arms exports, these numbers and ranks show that Turkey is closing the gap every year and increasing its arms exports and arms export share in the world with an increasing rate of 14.7%. The years 2005 and 2006 were the brightest years for arms export, and in 2005, arms exports increased 155%. According to SIPRI data, 1997 was the worst year for Turkey’s arms exports with nearly “0”, meaning that arms exports had negligible values.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.- Growth
Exports (b\$)	0.14	0.08	0.08	0.12	0.13	0.25	0.33	0.20	0.34	0.35	0.42	0.24
Growth (%)	0.00	42.9%	0.0%	53.8%	5.7%	92.3%	32.4%	-40.8%	73.5%	2.9%	20.0%	19.7%
Arms (b\$)	0	0.03	0.035	0.015	0.02	0.023	0.038	0.02	0.051	0.056	0.033	0.03
Growth (%)		16.7%	57.1%	33.3%	15.0%	65.2%	47.4%	155.0%	9.8%	41.1%	-2.7%	14.7%
Arms share	0	37.5%	43.8%	12.2%	15.4%	9.2%	11.5%	10.2%	15.0%	16.0%	7.9%	17.9%

Table 11. Arms Share in Exports¹¹²

Arms exports of the Turkish defense industry are given to provide an insight about Turkey’s relative position and development from the arms trade perspective. Arms exports constitute nearly 18% of defense industry exports. However, in 1998, it constituted 37.5%, and in 1999, it constituted 43.8%. In subsequent years, its share did not reach these amounts again, and instead followed a path between 8 and 16% of industry exports.

As mentioned before, Turkey’s defense industry exports have an increasing trend, with 20% as the average and the biggest export increase was in 2005 with a 75% increase. Industry exports have a 19.7% average growth rate. Excluding years 1999 and

¹¹² My calculations are based on SIPRI and SASAD data.

2004, they have followed an increasing trend. Industry exports dropped 42.9% in 1998 and 40.8% in 2005. Between the years 1997 and 2007, defense industry exports growth rate is 200%.

From the global aerospace and defense industry perspective, Turkey's position is nearly the same as in the arms trade. According to 2007 data, it ranks as the twenty-fifth biggest exporter and fourteenth biggest importer in the world. Turkey's export share of world defense trade is 0.18%, and their import share is 1.84%. The growth rate between 2002 and 2007 (5 years) is 306%. In \$246.700 million aerospace and defense industry market, the biggest exporter is the U.S., with a share of 39.55%, followed by France, with a share of 24.83%.

Rank	Country	Trade Value (exports-.Th. \$)	Share (%)	Growth (5 yr.)
1	United States	97,560,397	39.55	48.89
2	France	61,252,502	24.83	74.15
3	Germany	18,413,284	7.46	62.22
4	United Kingdom	17,068,322	6.92	47.43
5	Canada	16,869,831	6.84	13.5
25	Turkey	446,782	0.18	306.38

Michigan State University 03/2007

Table 12. Aerospace and Defense Industry Exports¹¹³

Comparing industry exports with imports shows that there is a huge gap between the two. However, this gap and Turkey's imports position relative to other countries is changing every year; in 2005, Turkey ranked as the 3rd biggest importer; in 2006, it ranked as the 11th; and in 2007, it ranked as the 14th biggest importer. The following table reflects the biggest 5 importers and Turkey's relative position.

¹¹³ Global Edge Industry Statistics, Official Website.
<https://globaledge.msu.edu/industries/tradestats.asp?industryID=42&ID=Exporting&SortBy=&View=§or=-1> (Accessed February 10, 2009).

Rank	Country	Trade Value (imports-Th..\$)	Share (%)	Growth (5 yr.)
1	France	38,413,426	13.17	43.06
2	United States	36,296,411	12.44	-12.11
3	China	24,479,372	8.39	162.11
4	United Kingdom	16,010,757	5.49	12.48
5	Germany	15,775,745	5.41	45.51
14	Turkey	5,352,753	1.84	133.31

Table 13. Aerospace and Defense Industry Imports¹¹⁴

The gap between imports and exports is not only damaging Turkey's economy, but also it is damaging their defense industry. The money that could be spent on the defense industry is going abroad without adding any value to the domestic defense industry.

Export structure is another important point that must be considered. Looking at the export structure of the defense industry shows that it is dominated by electronic products and biggest companies in the Turkish defense industry are working in the electronics field. It is not a coincidence, because electronics is a field that requires less investment compared with weapon systems and can be used for commercial purposes. The following figure shows the current exports of the Turkish defense industry.

¹¹⁴ Global Edge Industry Statistics, Official Website.
<https://globaledge.msu.edu/industries/tradestats.asp?industryID=42&ID=Exporting&SortBy=&View=§or=-1> (Accessed February 10, 2009).

COMPANIES	ORIGINAL DESIGN		EXPORTS	POTENTIAL EXPORTS
<u>ASELSAN</u>	Pedestal Mounted Stinger	Low Altitude Air Defense system	Holland	
	9600 Frequency Hopping Radio	Compliant with International Standards	Pakistan	
<u>ROKETSAN</u>	122 mm Multi-Launch Rocket System	Best in Class Long Range High Precision	UAE	Malaysia S. Arabia
<u>FNSS</u>	Tracked Armored Vehicle	Compliant with International Standards	UAE Malaysia Philippines	S. Arabia
<u>YONCA - ONUK</u>	Coast Guard Craft	Advanced Composite High-Speed Maneuver Capability Improved Reduced Signatures	Pakistan	USA Albania Malaysia
<u>HAVELSAN</u>	Pilot Simulator	Advanced Pilot Training	S. Korea	
	Electronic Warfare Test and Training Range (EWTTR)	Advanced Test and Simulation Environment High Technology Command and Control	Pakistan	S. Korea
<u>OTOKAR</u>	Cobra	Compliant with International Standards Modular	UAE Algeria Bahrain	Algeria

Figure 11. Defense Industry Exports (By Product)¹¹⁵

Another important point that must be considered about the above figure is the number of countries that import defense systems from Turkey. There are nearly 180 countries in the world, and only ten countries are currently importing Turkey's defense systems. This number shows that Turkey's defense industry has not been successful in exploiting the benefits of a huge defense market and has only been able to introduce its products to a handful of countries. The SSM is organizing defense industry products introduction meetings. However, as seen in the previous figure, they have not been effective enough to reach many countries. Two things must be considered to determine the reasons underlying this problem. The first one is product quality and the second is

¹¹⁵ Undersecretariat for Defense Industries, Official Website, "Defense Industry Exports." <http://www.ssm.gov.tr/EN/savunmasanayimimiz/ihracurunleri/Pages/default.aspx> (Accessed December 12, 2008).

political impact. Product quality is out of the scope of this thesis, but from the political perspective, it can be said that political impacts on industry exports are not enough to boost exports.

The other point that must be considered about this table is that, although Turkey has been fighting with terrorists for more than two decades, only a couple of products are produced and exported that can be used against terrorist attacks. Many countries around the world are faced with similar threats. If the Turkish defense industry focused on the existing threat and used the experiences gained by the Turkish Armed Forces up until now, many dollars would not be spent for acquiring the required equipment from abroad, and it would also be a good opportunity for industry exports.

The Turkish defense industry needs political impacts in the international arena to introduce its products and increase the level of exports. France may be a good model for Turkey. As mentioned earlier, political support plays an important role in France's defense exports and ministers take defense industry representatives with them on their visits to foreign countries. More than \$61 billion in exports shows French success in this arena. Turkish ministers' emphasis on defense industry products and their introduction may boost exports. Political support is also needed for introducing defense industry products to former USSR republics. Although Turkey has good relationships and national ties with most of them, such as Turkmenistan, Uzbekistan, Kazakhstan, Azerbaijan, and Kirgizstan, none of these countries are importing any defense products from Turkey. This can be explained by continued Russian dominance and impacts on these countries, but national ties and political assistance can open these markets to Turkey's defense industry products.

Using defense industry representatives in foreign countries can be another way to increase the export level of the Turkish defense industry; these representatives can be used either to introduce Turkish defense industry products or to follow the

technological developments in the countries in which they reside. Countries such as France, Singapore, and Israel are using these kinds of representatives efficiently to carry out export activities and to follow technological improvements.¹¹⁶

2. Offset Applications

Using offsets in procurements can help any government to achieve multiple objectives. These objectives can be: “acquiring new technology and capabilities, supporting key industries, gaining access to new markets, generating export earnings, and forming strategic alliances with established multinational enterprises.”¹¹⁷

Turkey has been applying offsets since 1985 to create a domestic defense industry and not to be dependent on foreign suppliers for defense needs. Since the establishment of the SSM, 63 offset agreements have been signed. 20 out of 63 offset programs were successfully completed, and 43 offset programs are still effective. The total offset commitment was \$6.1 billion and \$3.3 billion of these commitments have been fulfilled. The following table shows the categories of these offset applications.

OFFSET CATEGORY	AMOUNT (US \$ M)	%
Defense Goods and Services Exports	1.154	35
Export of Industrial Goods and Services	1.076	32
R&D, Tech. Coop., Investment, Others	733	22
Services for Turkish Armed Forces	375	11
T O T A L	3.338	100

Figure 12. Offset Applications by Category 1985-2007

¹¹⁶ *Turkish Defense Industry Special Commission report*, “Ninth Development Plan,” 2007. www.dpt.gov.tr/DocObjects/Download/3272/oik699.pdf (Accessed December 16, 2008), 83.

¹¹⁷ Claire Taylor, “Using Procurement Offsets as an Economic Development Strategy,” *Library House of Commons*, Research Paper 2004, 31.

The following figure shows direct and indirect offset commitments.

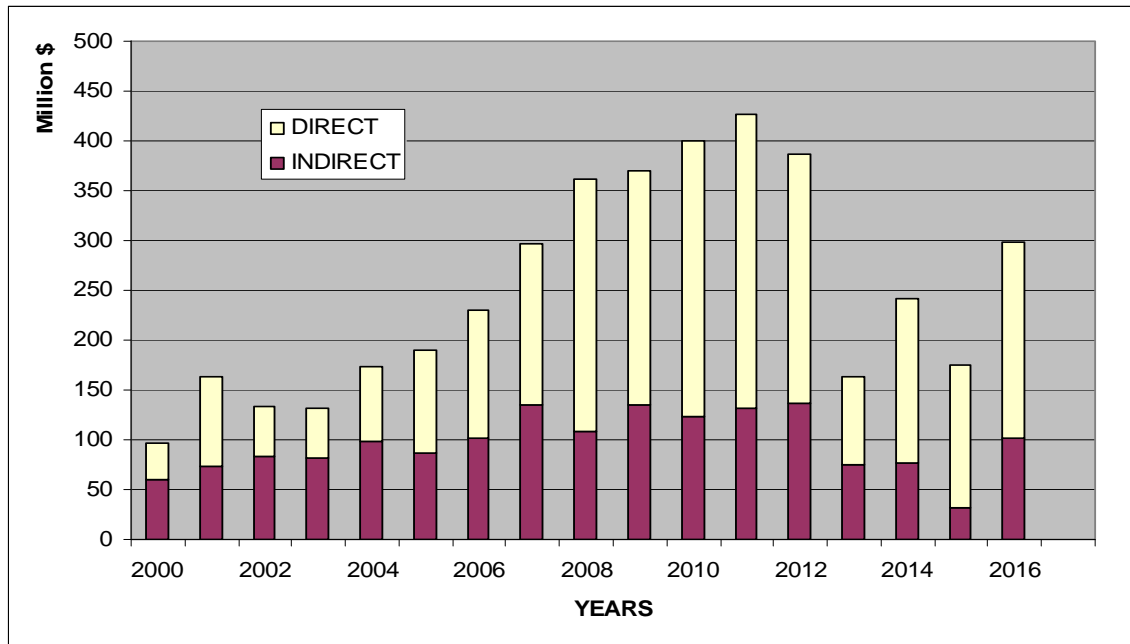


Figure 13. Remaining Offset Commitments by Year¹¹⁸

According to the U.S. Department of Commerce report between the years 1993 and 1999, Turkey had 4 agreements valued at \$158 million and the offset share was \$145.3 million, which constituted 91% of import agreements.¹¹⁹ Between the years 1993 and 2005, Turkey had 18 offset agreements valued at \$1.255 billion, and the import value of these contracts was \$2.695 billion. The offset share constituted 46.6% of imports. During this period, France’s offset share in imports was 84.6%, the UK’s offset share was 83.9%, Germany’s share was 100%, and European countries’ total offset share in imports was 98.8%. In most of the European countries, the offset requirement is 100%, but in Turkey, the offset share of imports is determined as 50% by new policy.¹²⁰

¹¹⁸ Goknur Pilli, “SSM Presentation” (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24 2007).

¹¹⁹ US Department of Commerce/BIS offset database, 2003, Adapted from “Offset policies and trends in Japan, South Korea, and Taiwan,” Michael W. Chinworth, 2003.

¹²⁰ U.S. Department of Commerce/BIS offset database, “Offsets in Defense Trade Eleventh report to Congress.” Jan 2007. http://findarticles.com/p/articles/mi_m0IAJ/is_3_29/ai_n19448297/pg_15 (Accessed December 18, 2008).

Offset commitments made by foreign contractors have special meaning for Turkish defense industry companies. They rely heavily on offsets to maintain their production lines, and to be competitive by creating economies of scale.¹²¹ With the help of offsets, defense industry companies gained the opportunity to have long-term strategic partnerships with foreign firms having offset obligations in Turkey, and they gained the opportunity to participate in international markets.

Comparing European countries' offset share in exports with Turkey's offset share shows that Turkey was not able to use the benefits of offsets as well as European countries. Turkey's high reliance on foreign suppliers indicates that offset applications were not as successful as they were intended be in creating a sound defense industry capability and could not achieve the objective of reducing the dependence on foreign suppliers. However, it still played a dominant role in industry exports; 70% of major defense industry company exports come from offset applications.¹²²

3. Research and Development

The amount spent on defense R&D is a valuable source for analyzing the importance of defense industry for a country; it shows the priority of defense industry among other industries. The money spent on R&D is the only method to develop a technology base and improve the capability of a defense industry. It also helps to increase the quality, rather than the quantity, of the arms.¹²³ In addition to having such pros, R&D includes serious risks and tradeoffs. Although investing in R&D is the only way to have a domestic or national industrial base, the money spent on R&D does not necessarily mean gaining the desired results. It being so important and involving such risks forces every state to think twice and make serious tradeoffs about allocating money for R&D. Another tradeoff about R&D includes time concerns, balancing today's urgent

¹²¹ Lale Sariibrahimoglu, "New Offset Policy to Boost Turkish Defense Exports," *Today's zaman*, May 28, 2007.

¹²² Murat Bayar, "SSM Presentation" (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24 2007).

¹²³ Keith Hartley, "Defence R&D: Data Issues", *Defense and Peace Economics*, Vol. 17(3), December 2005, 169–175.

needs with tomorrow's concerns. It requires patience; the desired results on a project may be obtained in a few years or may take decades. In the end, it may be too late, or requirements or desired results may change.

R&D spending can be divided into two categories: government spending and industry spending. Industry companies are not as eager to spend on R&D, mostly because of two things: they cannot earn high profits from the systems developed by their own R&D money, because governments impose profit limits, and also, governments want to control the characteristics of a weapon system, and they don't want to procure systems imposed by the companies.¹²⁴ In some cases, the risk associated with research and development prevents defense firms from spending their money on R&D instead of new investments. For these reasons, the government's emphasis on R&D activities gains high importance for defense industries.

Turkey has faced tradeoffs between present and future interests several times during the last decade. Because of threat assessments and fighting with terrorists, government officials considered every need as urgent and in need of being procured as soon as possible. The reality of this consideration is open to debate. But it is indisputable that these assessments were the biggest burden for structuring a domestic defense industry and were the primary reason for negligence of R&D.

Looking at the countries with high domestic contribution rates shows that their success is not a coincidence. They spend a lot of money on R&D. According to the Department of Defense Budget report, the U.S.'s defense R&D spending was \$72 billion in 2006, \$75 billion in 2007, and \$75 billion in 2008; nearly 13-15% of the defense budget was spent on R&D.¹²⁵ In 2008, total R&D spending from the federal budget was \$148 billion, and \$68.1 billion was spent just for weapon systems R&D.¹²⁶ The statistics are more or less the same in Europe. They spend 2-3% of their Gross National Product

¹²⁴ Peter Dombrowski and Eugene Gholz, *Implementing Military Innovation* (Columbia University Press 2006), 21.

¹²⁵ U.S. Department of Defense, "Defense Budget." <http://www.gpoaccess.gov/usbudget/fy08/pdf/budget/defense.pdf> (Accessed December 18, 2008).

¹²⁶ American Association for the Advancement of Science, "AAAS Preliminary Analysis of R&D in the FY 2008 Budget." <http://www.aaas.org/spp/rd/prel08p.htm> (Accessed December 28, 2008).

(GNP) on R&D.¹²⁷ Comparing these numbers with Turkey's R&D spending, which was 0.67% in 2002, including private and public R&D expenditure, and \$3.830 billion with 0.76% of GNP in 2005, shows that from the R&D perspective, R&D activities were not as supported by the Turkish government as in the U.S. and Europe. Although the goal of raising GNP spending on R&D to 2% by 2010 may boost the R&D spending level to European countries, according to SSM statistics, since 1985, around \$2 billion out of about \$14 billion spent by the SSM in the past 20 years for procurement projects has gone abroad to foreign companies for R&D on Turkish projects, and only 0.3% of the SSM's funding has been earmarked for domestic R&D since its establishment in 1985.¹²⁸

As mentioned earlier, defense companies are reluctant to spend their own money for R&D. European companies spent 6.6% of their turnover on R&D in 2001 and 20% in 2006; however, American companies spend only 3.2% of their sales on R&D and other R&D money comes from government assistance.¹²⁹ For the Turkish defense industry, the R&D share of industry turnover was 4.5% on average.¹³⁰ This percentage is higher than the U.S. defense industry company R&D share in their turnover; however, it is behind the R&D share of European defense industry companies in their turnover. For example, Finmeccanica, one of the Top 10 defense contractors in the world, spent 16.4% of its sales on R&D. The following figure shows the R&D share in Turkish defense companies' turnover from 1997-2007.

127 Murad Bayar, Undersecretary of Defense Industries (SSM), "A Globus Vision Exclusive Interview", Capital Magazine June, 2008.

128 Lale Sariibrahimoglu, "Turkey Makes Defense R&D Spending Priority," Jane's Defense Weekly November 24, 2004.

129 Vlachos and Dengler, *Off Track? The Future of the European Defense Industry*, International Defense Research Institute, RAND Publications 2004, 80.

¹³⁰ My calculations based on SASAD data.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
R&D (b\$)	0.034	0.048	0.042	0.043	0.024	0.049	0.058	0.064	0.079	0.09	0.12
Turnover (b\$)	1.205	0.968	1.075	0.852	0.849	1.062	1.301	1.337	1.591	1.72	2.011
R&D share (%)	2.8%	4.9%	3.9%	5.0%	2.9%	4.6%	4.5%	4.8%	4.9%	5.2%	6.0%

Average R&D Share Between 1997- 2007 = 4.5%

Table 14. R&D and Defense Industry Sales¹³¹

After the economic crisis in 2001, R&D share in company turnovers followed an increasing path, and in 2007, they spent 6% (industry average) of their turnover on R&D. Only two firms, ASELSAN and ROKETSAN, are spending 10% of their turnover on R&D.

The magnitude of the money allocated for R&D is another point that must be considered. In 1997, the money spent for R&D was nearly \$34 million and in 2007, it became \$120 million. Although the increase in these 10 years is 252%, the amount spent is not so much compared to other countries. The largest amount spent on R&D, by entire defense industry companies, was \$120 million in 2007. The amount spent on R&D by most of the European companies was much higher than this amount. For example, in 2007, EADS spent £1.983 million (\$2.830 million) on R&D, which was nearly 24 times more than the Turkish defense industry, and Finmeccanica spent £1436 million (\$2049 million) on R&D, which was 12 times more than the Turkish defense industry.¹³²

a. The Relationship Between R&D and Industry Sales

The relationship between R&D and industry sales is an important variable for measuring the effects of R&D on industry sales. Regression analysis was conducted to explore this relationship. R&D was considered the independent variable and industry sales was the dependent variable. According to regression analysis results, the coefficient

¹³¹ My calculations based on SASAD data.

¹³² Department for Innovations, Universities & Skills (UK), Official Website http://www.innovation.gov.uk/rd_scoreboard/?p=40 (Accessed December 22, 2008).

correlation was calculated as 0.9427, meaning that there is a strong positive relationship between R&D and industry sales. The least squares method was used to calculate the strength of this relation. The least squares line is:

$$\text{Industry sales} = 0.521 + 12.667 \text{ R\&D}$$

The slope of this line measures the marginal rate of change in the dependent variable. The slope is 12.667, which means that, for each unit increase in R&D, the marginal increase in defense industry sales was 12.667 units. The output showed that 88% of the variability (coefficient of determination- R square) in defense industry sales can be explained by R&D. Standard error (0.13) is judged according to the magnitude of the dependent variable. In this case, it is particularly small compared to the dependent variable (industry sales). Adjusted R square was calculated to avoid creating a false impression of a small sample size. In this model, Adjusted R square is 0.88, indicating that no matter how the coefficient of determination is measured, the model's fit is good. Statistical analysis showed that there is a strong positive relationship between R&D and defense industry sales.

b. The Relationship between R&D and Industry Exports

The relationship between R&D and industry export is another important variable to measure the R&D effects on exports. Regression analysis was conducted to explore this relationship. R&D was considered to be the independent variable and industry exports was considered the dependent variable. According to regression analysis results, the coefficient correlation was calculated as 0.852, meaning that there is a strong positive relationship between R&D and industry sales. The least squares method was used to calculate the strength of this relationship. The least squares line is:

$$\text{Industry exports} = 0.0021 + 3.7162 \text{ R\&D}$$

The slope of this line measures the marginal rate of change in the dependent variable. The slope is 3.7162, meaning that, for each unit increase in R&D, the marginal increase in defense industry sales will be 3.7162 units. The regression analysis output showed that 0.727% of the variability (coefficient of determination- R square) in

defense industry sales can be explained by R&D. Standard error (0.066) is judged according to the magnitude of the dependent variable. In this case, it is particularly small compared to the dependent variable (industry exports). Adjusted R square is calculated to avoid creating the false impression of a small sample size. In this model, adjusted R square is 0.70, indicating that however the coefficient of determination is measured, the model's fit is good. Statistical analysis showed that there is a strong positive relationship between R&D and defense industry exports.

4. Analysis of Current Program Structures

The Turkish defense industry development model has followed a path similar to many second-tier countries, beginning with imported arms and continuing with limited original designs. Three different approaches shaped Turkey's defense systems acquisition policy in the past. The first one was direct procurement, before 1990; joint developments and consortiums, between 1990 and 2000; and original design, after 2000. After 2000, priority was given to original design and industry development efforts focused on this approach.¹³³

The current status of major acquisition programs and how they are carried out are important variables to depict the current status of the Turkish defense industry and its industry development efforts so far. They show the domestic defense industry capability and the extent of the need for foreign suppliers to fulfill defense needs.

According to the SSM 2007 activity report, 107 acquisition programs are carried out by SSM and in 74 of the programs, they reached the agreement that valued \$17.38 billion (24.341 billion TL).¹³⁴ The acquisition of these programs is divided into four categories: domestic development, consortiums, joint production, and direct procurements from foreign suppliers.

¹³³ Undersecretariat for Defense Industries (SSM), Official Website, "Activity report 2007", 34. www.ssm.gov.tr (Accessed December 20, 2008).

¹³⁴ \$1 is calculated as 1.4TL.

Domestic production is defined as the acquisition programs that are developed by a main domestic contractor, and where intellectual and industrial property rights belong to Turkey.

Consortium is defined as the acquisition programs that result from harmonized military requirements, where system development activities are conducted by job-sharing partners or through a consortium of companies.

Joint production is defined as any system where intellectual and property rights belong to a foreign country, and therefore, domestic production is limited.

Direct procurement is defined as the acquisition programs that industry participation is limited to offsets.¹³⁵

According to 2007 data, from the perspective of the number of programs, 2 programs (nearly 2% of the total number) are being conducted by consortiums; 17 programs (16%) are being procured directly from foreign suppliers, and industry participation is limited with offsets; 62 programs (58%) are being developed domestically; 26 programs (24%) are being conducted in joint production. The following figure reflects this distribution.

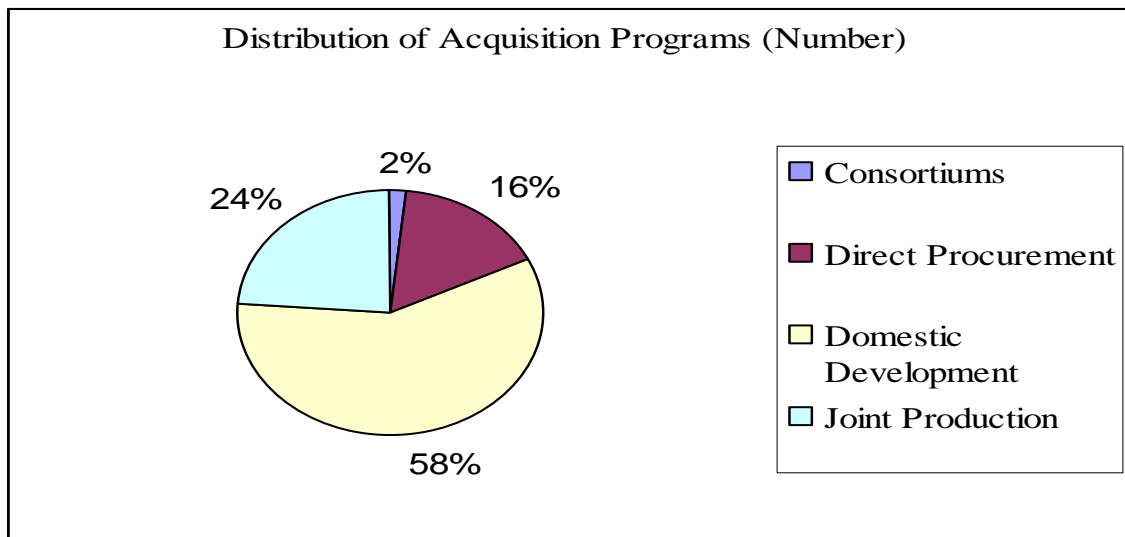


Figure 14. Acquisition Programs – Numbers

¹³⁵ Undersecretariat for Defense Industries (SSM), Official website, "Activity report 2007", 60. www.ssm.gov.tr (Accessed December 20, 2008).

From the value perspective: the value of the programs conducted by consortiums is \$1.91 billion (11%); the value of the programs that are being procured directly from foreign suppliers, where industry participation is limited with offsets, is \$1.39 billion (8%); the value of the programs that are being developed domestically is \$3.82 billion (22%); and the value of the programs that are being conducted in joint production is \$10.25 billion (59%). The following figure reflects this distribution.

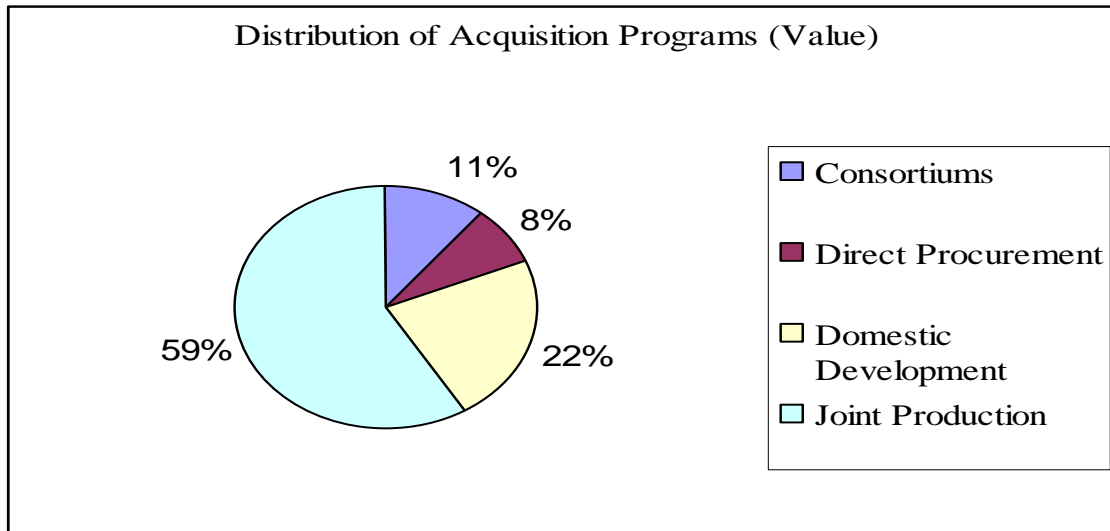


Figure 15. Acquisition Programs – Value

These numbers show that the share of domestically developed programs, from the perspective of the number of programs, is the biggest share; but this is not true from the value perspective. The programs that are being developed by domestic companies worth only 22% of what is being spent on defense acquisition programs. Joint production has the biggest value, at 59%. Turkey is highly dependent on foreign suppliers for acquiring defense systems from the value perspective, because all other acquisition approaches include foreign company participation. But the good point of this current status is, every approach is adding value to the Turkish defense industry, including direct procurement limited with offsets. Although the intellectual and industry rights belong to foreign firms in joint production, producing or assembling them inside the country is important for improving the capabilities of the defense industry, and for providing experience for future

applications. Consortium is another approach that adds value and improves the capabilities of the defense industry by sharing the job from the beginning to the end of a program.

D. CHALLENGES OF TURKEY'S DEFENSE SYSTEMS ACQUISITION POLICY

1. Selected Acquisition Programs

a. Altay Main Battle Tank Program

The Altay Main Battle Tank Project will be the biggest challenge of the Turkish defense industry in the near future. What makes this program so special is that it is the first main battle tank that will be designed and produced by the Turkish defense industry by using existing industrial capabilities. All intellectual and ownership rights will belong to the Turkish government.

When the program started in 1996, the first objective was to produce a tank under the license of an existing tank in the world. Because of the high costs, the program was cancelled in 2004, and it changed direction in 2005. The decision for a national main battle tank was given in 2005, after a feasibility study was completed. OTOKAR was chosen as the prime contractor in 2007.

The objective is to produce 250 tanks for the Turkish Army, after 7 years of prototype production and testing. The estimated budget for design, prototype production, test, and evaluation is \$500 million. ASELSAN will work as a subcontractor on subsystems such as the fire control system, C4SI Systems, and integration studies. Hyundai-Rotem (South Korea) is another subcontractor that will provide technical support and assistance and will supply more than 50% of the technology to develop the tanks. The other subcontractors are MKE and ROKETSAN, who will design, develop,

and produce gun systems and armor systems.¹³⁶ The program includes technology transfer worth \$330 million, and the production of 4 prototypes worth \$70 million. Once development is complete, a second set of contracts will be signed.¹³⁷

It is obvious that this program, if it is completed as intended, will add many things to the defense industrial base and industry exports. Until the inception of this program, the tradeoff among resources delayed producing a main battle tank, and Turkey focused mostly on modernizing existing tanks, which has added almost no value to the defense industrial base until now.

b. T- 129 Atak Helicopter Program

The objective of this program is to meet the need of the Turkish Army for an attack and tactical reconnaissance helicopter. The important point in this program is that high-tech equipment, developed by national firms, will be integrated into procured helicopters. The program model that will be used is direct procurement with local integration. AgustaWestland, Eurocopter, Denel, and Rosoboronexport competed for the program and the government decided to continue negotiations with AgustaWestland. Tusas Aerospace Industries (TAI) was chosen as the prime local contractor.¹³⁸

The estimated value of this program to AgustaWestland is in excess of 1.2 billion EURO, based on the requirement for 51 A-129 helicopters (about \$1.6 billion). The program is expected to last for 114 months (9.5 years), and the 1st “T-129” (Turkish version) attack helicopter will be delivered to Turkey in June 2013. According to Turkish Defense Minister Vecdi Gonul, “The AgustaWestland proposal includes significant

¹³⁶ *Turkish Defense News*, “Turkey's National Main Battle Tank Project (ALTAY) Started with the Ceremony Held at OTOKAR Factory,” September 19, 2008.

¹³⁷ *Defense Industry Daily*, “Turkey Signs Deal With S. Korea for Altay Tank Project,” August 3, 2008.

¹³⁸ Undersecretariat for Defense Industries (SSM), Official Website, “Programs, Atak Helicopter,” www.ssm.gov.tr (Accessed December 25, 2008).

industrial benefits for Turkey. Several leading Turkish aerospace companies, such as TAI and ASELSAN, will be involved in the programme. Final assembly, delivery and acceptance of the aircraft will also take place in Turkey.”¹³⁹

Many problems were witnessed during the acquisition efforts of this new helicopter. Because of numerous snafus, technology transfer and production issues, and canceled competitions, all three invited American manufacturers had abandoned the competition entirely. But the Turkish government’s emphasis on technology transfer and on export right will add a new product that can be exported by the Turkish company TAI, and will add new expertise to the technology baseline. “TAI will be the sole source for the production of the whole fuselage, including final assembly and flight operations, and will be responsible for marketing the “T-129 attack helicopters” to the world.”¹⁴⁰ And another good point about this situation is that ASELSAN will increase its skills in helicopter technology by using its own systems during the production phase.

c. A400M Future Large Aircraft

The objective of this program is to provide tactical transportation to the Turkish Armed Forces. Ten A400M transport aircraft will be procured using the consortium model and prime contractor is the AMSL (Airbus Military Sociedad Limitada). The contract was signed in 2003, and the program is still in existence. The final assembly line is planned to start in April 2007, and the first flight is scheduled for January 2008. The delivery of 10 A400M aircraft to Turkey will be completed between 2009 and 2014. The delivery of 180 A400M aircrafts to participating nations will be completed in 2021.¹⁴¹

The A400M is a military transport aircraft designed to meet the requirements of eight European air forces (Belgium, France, Germany, Italy, Portugal, Spain, Turkey, and the United Kingdom) to replace their fleets of C-130 Hercules and C-

¹³⁹ *Defense Daily*, “Turkey Finally Lands Upgraded Attack Helicopters,” June 25, 2008.

¹⁴⁰ *Defense Daily*, “Turkey Finally Lands Upgraded Attack Helicopters,” June 25, 2008.

¹⁴¹ Undersecretariat for Defense Industries (SSM), Official Website, “Programs, A400M Future Large Aircraft,” www.ssm.gov.tr (Accessed December 25, 2008).

160 Transalls. Based on the number of aircrafts, Turkey's participation share is 5.56%. TAI's, the biggest Turkish aerospace company, job share on body production is 7.15% and system job share is 1.26%.

The A400M project is expected to be the most important aviation project to add value to the Turkish defense industry aviation technology baseline. With this program, TAI will get the European Aviation Security Agency (EASA) approved design certificate and will participate in a program beginning from the design phase and will take part in all phases for the first time. The job share is not limited to TAI; other Turkish companies, such as TEI SELEX, ASELSAN, and HAVELSAN, will have job shares in this program as well.¹⁴²

d. F-35 Joint Strike Fighter

The JSF Program, being the largest-ever defense acquisition program in history, was initiated by the U.S. Government to meet the new generation fighter aircraft requirements of the U.S. Services beyond 2010. The program scope consists of cooperative development, production, and sustainment of the F-35 aircraft within an international partnership. The program model to be used is a consortium, and the prime contractor is LM Aero Team (Lockheed Martin, Northrop Grumman, and BAE Systems). The project scope is to produce 3,173 aircrafts. The U.S. is the major player in this program, and will acquire 2,443 aircrafts, followed by the UK with 138 aircrafts. Turkey is the third largest participant, with \$175 million invested, and wants to acquire 100 aircrafts at a cost of around \$10 billion to replace the existing F-4 and F-16 aircrafts beyond 2012.¹⁴³ SSM and TAF reps are regularly attending the production activities. SSM and Turkish industry representatives are working hard to increase the level of Turkish industrial participation.¹⁴⁴

¹⁴² Turmus Teker, "Avrupa'da Ortak Savunma Sistemleri Tedariki -Occar Ornegi" (Thesis diss.Undersecretariat for Defense Industries 2006), 45.

¹⁴³ *Jane's*, Sentinel Security Assessment, "Eastern Mediterranean," January 12, 2009.

¹⁴⁴ Undersecretariat for Defense Industries (SSM), Official Website, "Programs, F-35 Joint Strike Fighter." www.ssm.gov.tr (Accessed December 25, 2008).

Working with global players will add serious skills to the Turkish defense industry. The biggest challenge about this program is increasing the job share of Turkish companies. “Lockheed Martin has so far identified \$4.5 billion of potential work for Turkey within the JSF program and has promised to increase this to around \$5 billion.” The Northman Group and TAI signed an intent agreement about the job share over the 20 years that is worth \$3 billion. With this agreement, TAI will become a second-source production center for a minimum of 400 center fuselage sections. The parts will be manufactured during the low rate initial production phase of the F-35.¹⁴⁵

2. Global Financial Crisis and its Possible Impacts

The global financial crisis is and may continue to be the most important challenge for both the state economies and defense industries. According to U.S. Spy Chief Dennis C. Blair’s report to Congress, based on threat assessment, economic turmoil and instability are the most urgent threats that the U.S., a major player in both the global economy and defense market, is facing today.¹⁴⁶ It is evident that this turmoil and instability is affecting economies all over the world: “[s]tock markets are down more than 40% from their recent highs. Investment banks have collapsed, rescue packages are drawn up involving more than a trillion U.S. dollars, and interest rates have been cut around the world.”¹⁴⁷ And the real problem is that how long this crisis will take is still unknown.

From the defense spending perspective, the U.S. Department of Defense is preparing budget cuts as a response to the decrease in national income, and several stimulus packages are being prepared by the government. Many countries are taking the same measures and preparing budget cuts in discretionary parts of their budgets, such as defense spending. According to some analysts, including Martin Feldstein, a professor at

¹⁴⁵ *Jane's Sentinel Security Assessment*, “Eastern Mediterranean.” January 12, 2009.

¹⁴⁶ NY Times, “Global Economy Top Threat to U.S., Spy Chief Says, Mark Mazzetti,” February 12, 2009.

¹⁴⁷ Te Velde, Dirk Willem, “The Global Financial Crisis and Developing Countries,” ODI, October 2008.

Harvard, the logic should be the opposite; defense spending can be a great stimulus for the economy and can provide job opportunities in both defense industry companies and supporting industries.¹⁴⁸

From the defense companies' perspective, for most of them, the year was not too bad. Due to their low debt rates and cash flows, they have not been as affected by the crisis as other industries. For example, according to an analysis conducted by Pierre Chao from Renaissance Strategic Advisors, a \$5 billion debt rate and \$20 billion cash flow protected U.S. defense industry companies from the serious effects of the financial crisis. Defense industry companies used their cash flow either for acquiring specialized companies in the defense market or buying companies from unrelated industries to expand their portfolio. But for companies that gain most or at least half of their revenues from commercial sales, like Boeing or General Dynamics, the year 2008 was very hard. They faced a serious share loss in stock markets. For example, Boeing lost half of its share value; General Dynamics, 38%; and the Northman Group lost 48% in share value, in 2008.¹⁴⁹

According to Turkish Government officials, Turkey will not feel the effects of financial crisis as much as the U.S. and most European countries. The primary reason for this determination is the serious efforts taken after the economic crisis in 2001 to strengthen the Turkish banking sector and economic structure. Because of this determination, acquisition officials have stuck to the 2007-2011 acquisition plan and no adjustments have been made on acquisition accounts. According to Murad Bayar, Defense Industries Undersecretary (SSM), the defense industry will overcome this financial crisis by developing domestic technology, creating new employment opportunities in defense companies, and by increasing exports.¹⁵⁰ This may be a correct approach if applied persistently. Defense spending might be a great stimulus for creating

148 Martin Feldstein, "Defense Spending Would be a Great Stimulus," *Wall Street Journal*, December 23, 2008.

149 Antonie Boessenkool, "Tough Economic Year Not Too Bad for Defense Firms," *Defense News*, December 15, 2008.

150 Lale Sariibrahimoglu. "Economic Crisis to Affect Turkish Defense Sector," *Euroasia Daily Monitor*, January 6, 2009.

new employment opportunities, and exports may be increased during this financial crisis with the help of the increasing value of the dollar and 70% offset structure of defense industry exports. However, the biggest problem for the Turkish government might also be the increasing dollar value against Turkish liras, which will increase the cost of imported defense systems. When the plan for acquisition of defense systems was implemented, 1 dollar was between 1.2-1.3 Turkish liras. But according to the currency exchange rate of February 2009, 1 dollar now equals 1.65 Turkish liras, which means that the price of imported weapon systems has already increased nearly 30%. Considering the huge gap between industry exports and Turkey's imports from foreign suppliers, the future does not seem so bright from the defense systems perspective. If the value of the dollar continues to increase against the Turkish lira, serious adjustments will have to be made on procurement accounts. It is obvious that these adjustments will primarily affect Turkish defense industry companies and their working partners. Limited amounts of exports and 70% offset share on exports may not help them as expected. Serious measures to overcome these problems must be considered by acquisition officials instead of maintaining the present course.

3. Mergers and Acquisitions

Company mergers and acquisitions are the other challenge for defense industries. As mentioned in earlier chapters, most of the defense companies all around the world are consolidating their powers with mergers and acquisitions to increase their competitive power and sustain their assembly lines. In most countries, a small number of companies are dominating the defense market. Turkish defense companies' reactions to this trend are very important for the future of the Turkish defense industry.

The merger and acquisition "wind," despite narrowing demand in the defense market and the economic crisis in 2001, did not affect the Turkish defense industry in previous years, primarily because of three reasons. The first one is that 64% of Turkish defense industry companies, as expressed in Figure 5, are owned by the government and

foundations, and they are not as sensitive to the shareholders' profit expectations. For this reason, they primarily focus on different commodity areas of the defense industry and their aim is to provide internal growth by specializing in these fields.¹⁵¹

Lack of competitive power in the international defense market and being a developing industry is the second reason. Industry exports are the major indicators that reflect the competitive power of a defense industry abroad, and as expressed in previous pages, Turkish defense industry exports are very limited and, from the financial perspective, far behind the competing powers in the defense market.

Uncertainty about membership in the European Union is the third reason. Because of this uncertainty, the long term effort of the collective European defense market has not been a focal point for Turkish defense industry companies. However, if Turkey enters the European Union, Turkish defense companies may respond to new changes with mergers and acquisitions, first inside the country and then with international companies.¹⁵²

E. SUMMARY OF RESULTS

The primary research question analyzed in this chapter was “How did Turkey’s defense systems acquisition policy affect the Turkish defense industry?” Financial variables of the defense industry and current program structures were analyzed to answer this question. Possible future challenges were analyzed to define prospective threats and opportunities and to make recommendations for future applications. The following pages summarize the analysis of these results.

1. Financial Variables

Turkey’s defense spending, industry sales, industry exports, R&D money, offset applications, and current program structures were the financial variables of the Turkish defense industry analyzed in this chapter.

¹⁵¹ Kaya Yazgan, “Company Mergers From The Defense Industry Perspective,” 12-13. www.sasad.org (Accessed December 20, 2008).

¹⁵² Kaya Yazgan, “Company Mergers from the Defense Industry Perspective,” 12-13. www.sasad.org (Accessed December 20, 2008).

Turkey's defense spending and its relationship with Turkish defense industry sales were analyzed to determine the direction of government spending. The expected outcome of this analysis was a positive linear relationship because defense spending of a country, having developed defense industry, follows a similar path with defense industry sales. However, Turkey's defense spending and industry sales had a negative relationship over 10 years, which is not so meaningful in the long run and cannot be sustainable. The primary reason for this negative relationship was determined to be the effect of the increase of the domestic contribution rate of the defense industry. Turkey is meeting defense needs and, compared to previous years, more acquisitions are coming from domestic defense industry companies than external companies. However, this proportion or rate is still far behind the developed countries. The current domestic contribution rate in Turkey is 41.6%, and this rate in most of the developed countries is between 80 and 90%. Another point found in this analysis was about defense industry sales. Defense industry sales are important in determining the competitive power of a domestic defense industry, and analysis showed that the current figure was very low compared to the defense industry power of other developed countries.

Next, industry exports were analyzed to determine the assembly line sustaining power and defense industry power from the export perspective. Industry exports, from the arms trade perspective, grew 14.7% on average, and industry exports as a whole grew 19.7%. The growth rates followed increasing trends, which is very important for the defense industry. However, comparing the magnitude of exports showed that they were still far behind the developed countries, and with these growth rates it is nearly impossible to compete in the global market. Another point of analysis was the variety of industry exports . The Turkish defense industry had not made use of the experiences learned from fighting with terrorists and did not focus on products that were needed for fighting with terrorists until recent years. The other point found in this analysis was that industry exports were limited to only a couple of countries, which showed the need for government oversight and support in the international defense market. Former Soviet

republics, because of their national ties and nearness, as potential customers, and industry representatives residing in different countries could present a significant market for boosting industry exports.

Offset applications were analyzed to determine their share in the defense trade and industry exports. The results showed that defense industry exports depended highly on offsets with 70%, but this offset rate was lower than most of the countries around the world. Another point about offset applications was that the offset share on imported defense products in previous years was higher than in current years. It was 91% between the years 1993 and 1999, but decreased to 46.6% between the years 1999 and 2005.

The spending allocated for R&D was analyzed to determine the priority of R&D from both the government's perspective and the industry perspective. From the government's perspective, the importance of R&D for developing a domestic defense industry has not been realized. The money allocated for R&D purposes was much lower than both the European and the U.S. averages. From the defense industry perspective, their R&D percentage in sales was near the European company average and more than the U.S. company average; however, their magnitudes were much lower than other companies. Another analysis was conducted to measure the R&D effects on both industry sales and industry exports. Both analyses showed that there was a strong relationship between these two variables and R&D. The money allocated for R&D affected both industry sales and industry exports positively. Based on this analysis, it can be concluded that if the money allocated for R&D is increased, it will increase industry sales and exports.

Finally, current program structures were analyzed, from both the perspective of the number of programs and the financial perspective, in order to determine the order of precedence effects of defense systems acquisition policy on current programs. The results showed that all the programs were adding value to the Turkish defense industry, but still depended highly on foreign suppliers to produce or acquire major systems. From the value perspective, which expresses the magnitude of the programs, domestically developed programs only constituted 22% of all the programs.

2. Future Challenges

Selected acquisition programs, global financial crisis, and industry mergers and acquisitions were analyzed to determine the future challenges of the defense industry.

The Altay Main Battle Tank, as an example of domestic production, is very important for the Turkish defense industry because it will show the capabilities of the industrial base and will create a good opportunity for increasing industry exports. Similarly, the T-129 Atak Helicopter Program will add value to the Turkish defense industry. Other selected programs, such as the F-35 JSF and A400M aircrafts are the other biggest challenges for the Turkish defense industry. Increasing their share in these programs should be major objectives and have the potential to add substantially to the aviation technology base.

The global financial crisis, although no measures have been considered to date, is another big challenge for the Turkish defense industry. No adjustments have been made in acquisition programs to date, but the value of the dollar is increasing against the Turkish lira every month. Considering that most agreements are made based on the dollar, if this increase continues, most of the acquisition programs will be more expensive than previously estimated. According to government acquisition officials, the defense industry will overcome this crisis and its effects by creating employment in defense companies through increased defense spending on domestic companies. Turkish defense industry companies' high dependency on offsets in their exports is another important point that must be considered about the financial crisis. If they make adjustments to acquisition programs and cancel some of them, this will not only negatively affect defense industry companies and their trading partners, but it will also negatively affect defense industry exports, which depend on the 70% offsets.

Mergers and acquisitions trends all over the world have not affected the Turkish defense industry to date, primarily because of three reasons: a high percentage (64%) of government and foundation ownership of defense companies, being a young and

developing industry, and uncertainty about European Union membership. If Turkey is accepted into the European Union, it can be expected that company consolidations will take place in the near future; if not, current status may continue.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSION

The primary research question addressed in this thesis was: “How did Turkey’s defense systems acquisition policy affect the defense industry?”

Answer: This policy and supporting strategies increased all the financial variables of the defense industry, but the increase of these variables was not enough to increase the competitive power of Turkish defense industry companies within the global defense market. According to second-tier industry development models, Turkey has not been able to reach the last phase, “complete independence of R&D and production.” However, the emphasis on this policy has structured current acquisition programs with value-adding approaches such as: domestic production, joint production, consortiums, and direct procurement, including 50% offset to the defense industry.

This research was limited to financial variables and future challenges of the defense industry; product quality was outside the scope of this thesis. Further research should be conducted to address the quality and competitiveness of Turkish defense products.

B. RECOMMENDATIONS

According to analysis conducted during this thesis, current trends are not enough to fulfill the major policy objective: an independent defense industry that can compete in the global defense market. In order to achieve this objective, the Turkish defense industry needs a big leap and serious government measures should be considered to provide this leap.

Increasing the domestic contribution rate is not an easy objective that can be achieved in the short term; its increase depends heavily on other financial variables of the defense industry, such as sales, industry exports, offsets, and additional discretionary budget.

According to the analysis of the relationships between R&D and industry sales and between R&D and exports, there is a strong positive relationship between R&D and industry sales, and between R&D and exports. These relationships suggest that R&D money allocated for defense can increase both of these variables, if the R&D is thoughtfully constructed. R&D for defense has been neglected by the Turkish government so far, and it should be increased in order to fulfill policy objectives.

Other ways to increase exports can be ministry-level political support, using industry representatives all over the world and using the experiences learned about fighting with terrorism on innovative product development.

Offset shares on imported products should be increased to European levels (100%) in order to exploit the benefits of offsets more.

Current joint programs, such as the F-35 Joint Strike Fighter and the A400M, provide good opportunities for the Turkish defense industry that can help improve the technology and experience in the technology base. Turkey should increase its participation share to gain more from these programs.

The global economic crisis has not been considered to date, but it may seriously affect multiple variables in the defense industry and increase the cost estimates of acquisition programs. Cutting some of these programs is likely to seriously damage both defense industry companies and their trading partners. On a more positive note, Defense spending can also be a great stimulus to lessen the effects of the financial crisis.

LIST OF REFERENCES

- American Association for the Advancement of Science. "AAAS preliminary analysis of R&D in the FY 2008 budget." <http://www.aaas.org/spp/rd/prel08p.htm> (Accessed December 28, 2008).
- Atesoglu, Sonmez. "Defense spending and aggregate output in the United States, School of Business." Clarkson University, NY, September 2007.
- Auroy, Patrick. "The French approach to a European defense industrial base." *European Affairs*, June 2007.
- Aviation Week & Space Technology. December 17, 2007, Vol. 167, "Sarkozy moves to push French exports."
- Boessenkool, Antonie. "Tough economic year not too bad for defense firms." *Defense News*, December 15, 2008.
- Bales, Jason W. and Ferenc Nicholas G. "Defense globalization: Impacts on the United States defense acquisition system". MBA professional report, NPS, 2007.
- Bayar, Murad. Undersecretary for Defense Industries (SSM). "Interview with Globus Vision Exclusive." *Capital Magazine*, Jun 2008.
- Bitzinger, A. Richard. *Towards a brave new arms industry*, Oxford University Press 2003.
- Bureau of Industry and Security. "Offsets in defense trade, 13th Report to Congress." http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/13th_report_to_congress.pdf (Accessed January 12, 2009).
- Business Monitor. "Turkey Defense & Security Report Q3 2008." Military Structure and Defense Industry.
- Central Intelligence Agency. *World Fact Book*, "Rank order- GDP (Purchasing Power Parity)." <https://www.cia.gov/library/publications/theworldfactbook/rankorder/2001rank.html> (Accessed January 5, 2009).
- Data Monitor. "Aerospace & Defense in Germany." December 2008.
- Defense Daily News. "Turkey finally lands upgraded attack helicopters." 25-Jun-2008.
- Defense News. "Top 100 defense contractors list." http://www.defensenews.com/static/features/top100/charts/top100_08.php?c=FEA&s=T1C (Accessed January 9, 2009).

- DoD Security Cooperation Agency. "Overarching description" Frequently asked questions. <http://www.dsca.mil/pressreleases/faq.htm> (Accessed December 10, 2008).
- Department for Innovations, Universities & Skills (UK), Official Website. http://www.innovation.gov.uk/rd_scoreboard/?p=40 (Accessed December 22, 2008).
- Department of State, Countries, Turkey. <http://www.state.gov/r/pa/ei/bgn/3432.htm> (Accessed January 10, 2009).
- Defense Systems Management College*. "A comparison of the defense acquisition systems of France, United Kingdom, Germany and The United States." <http://www.dau.mil/pubs/misc/acq-comp-euro00.pdf> (Accessed December 26, 2008).
- Dombrowski, Peter and Eugene Gholz. *Buying military transformation*. Colombia University Press 2006.
- Epicos, Industry and Defense Portal. "A discussion with Joseph Ackerman, President and CEO of Elbit Systems, Israel's largest defense company." November 18, 2008.
- European Defense Agency, Press Release*. "Radical change and true European market needed to secure future of European defense industry." February 1, 2007. <http://www.eda.europa.eu/newsitem.aspx?id=58> (Accessed December 12, 2008).
- Feldstain, Martin. "Defense spending would be a great stimulus". *Wall Street Journal*, December 23, 2008.
- Government Accountability Office Report. "DOD's critical technologies lists rarely inform export control and other policy decisions". July 2006. <http://www.gao.gov/products/GAO-06-793> (Accessed December 12, 2008).
- Gholz and Dombrowski. *Buying military transformation*. Colombia University Press 2006.
- Global Edge Industry Statistics. "Defense industry." <https://globaledge.msu.edu/industries/tradestats.asp?industryID=42&ID=Exporting&SortBy=&View=§or=-1> (Accessed February 10, 2008).
- Green, Michael. "Arming Japan: defense production, alliance politics and postwar search for autonomy." *Asian Studies Review*, 24 1, 1995, 125-127.

- Guay, Terrence R. "The Transatlantic defense industrial base: Restructuring scenarios and their implications." United States Army War College. *Strategic Studies Issue*, 2005.
<http://www.strategicstudiesinstitute.army.mil/Pubs/display.cfm?pubID=601>
(Accessed December 26, 2008).
- Gunluk-Senesen, Gulay. *Türkiye'de savunma harcamaları ve ekonomik etkileri*. TESEV Publications, 2002.
- Halicioğlu, Ferda. "Defense spending and economic growth in Turkey: An empirical application of new macroeconomic theory". *Review of Middle East Economics and Finance*, Vol.2, No.3, 2004.
- Habertürk News Release.
<http://www.haberturk.com/haber.asp?id=45618&cat=110&dt=2007/11/27>
(Accessed January 10, 2009).
- Hartley, Keith. "Defense R&D: Data issues." *Defense and Peace Economics*, 2006, Vol. 17(3) June, 2005.
- Inbar and Zinberfarb. *The politics and economics of defense industries*. Frank Cass Publishers 1998.
- Jane's Defense. Budgets - Turkey. July 4, 2008.
- Jones and McCaffery. *Budgeting, financial management and acquisition reform in the U.S. Department of Defense*. NC: Information Age Publishing 2008.
- Katz, James Everett. *Arms Production in Developing Countries*. Lexington Books. 1984.
- Kızıroğlu, A. Mithat. "Savunma sanayi ve özelleştirme açısından değerlendirilmesi." Thesis diss. Halic University, 2007.
- Krause, Keith. "Arms and the State: Patterns of military production and trade." 1992.
- Maccay, Gavin. "Governmental initiatives in defense exports." SSM Defense Industry Conference, 2007.
http://www.ssm.gov.tr/TR/etkinlikler/konferanslar/Documents/20_yil/207-213_Gavin_MACKAY.pdf (Accessed December 20, 2008).
- Markowski and Wylie. "The emergence of European defense and defense industry policies." *Security Challenges Journal*, volume 3, number 2, 2007.
- Marvel, Barry. "International offset practices." *Contract Management Magazine*, May 2001.

- Mawdsley Jocelyn and Brzoska Michael. "Procurement, arms exports and industrial offsets in Britain and Germany." *Arms Trade Offsets: Theory, Policy, and Case Studies*, London, Routledge, 2003.
- Mazetti, Mark. "Global economy top threat to U.S. spy chief says." *NY Times*, February 12 2009.
- National Science Foundatio. "President's FY 2009 budget requests 3.4% increase in R&D funding." <http://www.nsf.gov/statistics/infbrief/nsf08312/> (Accessed March 14, 2009).
- Nolan, E. Janne. *Military Industry in Taiwan and South Korea*. Palgrave Macmillan, 1986.
- Ozlu, Husnu. "Turkish defense industry after second World War." Doctorate thesis diss, Dokuz Eylul University, 2006.
- Pilli, Goknur. "SSM presentation" (Paper presented at Undersecretariat for Defense Industries, Offsets in Turkish Defense Procurements Conference, Ankara, Turkey, May 24, 2007).
- Sariibrahimoglu, Lale. "New offset policy to boost Turkish defense exports," Today's Zaman Newspaper, 28 May 2007. "Turkey spends more on defense" *Today,s Zaman*, January 16, 2009.
- Secretariat General for EU Affairs. "Screening enterprise and industrial policy." http://www.abgs.gov.tr/tarama/tarama_files/20/SC20DET_DEFENCE.pdf (Accessed December 20, 2008).
- Security Cooperation Agency. "DoD, overarching description frequently asked questions".
- Sharp, Travis. "The U.S. military spending vs. The World". The Center for Arms Control and Nonproliferation. http://www.armscontrolcenter.org/policy/securityspending/articles/fy09_dod_request_global/ (Accessed December 12, 2008).
- Stockholm International Peace Research Institute (SIPRI). "The SIPRI definition of military expenditure." http://www.sipri.org/contents/milap/milex/mex_definition.html (accessed December 20, 2008).
- Taylor, Claire. "European security and defense policy: Developments since 2003." Library House of Commons, Research Paper 06/32, June 2006.
- Turkish Defense Industry Manufacturers Association, Reports. Official Website www.sasad.gov.tr (Accessed November 20, 2008).

- Turkish Defense Industry Special Commission Report. “9th development plan,” 2007.
www.dpt.gov.tr/DocObjects/Download/3272/oik699.pdf (Accessed December 16, 2008).
- Turk, Hunkar Karahan. “Türk savunma sanayinin ekonomik etkileri ve savunma harcamalari-büyüme ilişkisinin ekonometrik modellenmesi.” Thesis Diss. Cukurova University, 2007.
- U.S. Bureau of Industry and Security. “Offsets in defense trade, 12th report to Congress.” December 2007.
http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/offsets/13th_report_to_congress.pdf (Accessed January 12, 2009).
- U.S. Department of Commerce/BIS offset database. “Offsets in defense trade eleventh report to Congress.” January, 2007.
http://findarticles.com/p/articles/mi_m0IAJ/is_3_29/ai_n19448297/pg_15 (Accessed December 18, 2008).
- US Department of Commerce/BIS offset database, 2003, adapted from: “Offset policies and trends in Japan, South Korea, and Taiwan,” Michael W. Chinworth, 2003.
- US Department of State. “Background Note: Turkey.”
<http://www.state.gov/r/pa/ei/bgn/3432.htm> (Accessed December 26, 2008).
- Undersecretariat for Defense Industries (SSM). Official Website.
www.ssm.gov.tr (Accessed December 20, 2008).
- Velde, Dirk William. “The Global Financial Crisis and Developing Countries.” ODI Publications October 2008.
- Vlachos and Dengler. *Off track? The future of the European defense industry*, International Defense Research Institute, RAND Publications 2004.
- Woodward, Michael K. “An Analysis of the Impact of Offset Requirements on the U.S. and Defense Industry.” Thesis diss NPS, 1995.
- Yazgan, Kaya. “Turkish defense industry with numbers” and “Mergers and acquisitions from defense industry perspective”. SASAD Publications. www.sasad.org (Accessed December 23, 2008).
- Yoder, Elliot C. “Engagement versus disengagement.” Acquisition Research Paper Naval Postgraduate School. November, 2004.
<http://bosun.nps.edu/uhtbin/hyperionimage.exe/NPS-AM-05-001.pdf> (Accessed December 26, 2008).

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California
3. Prof.Dr.Y.Müh.Alb. Taner ALTUNOK
Kara Harp Okulu Savunma Bilimleri Enstitüsü
Ankara, Turkey
4. Lawrence R. Jones
Naval Postgraduate School
Monterey, California
5. Michael W. Boudreau
Naval Postgraduate School
Monterey, California