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**Defense Industry Participation in
Economic Growth**



Rio de Janeiro

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Course Conclusion Work presented to Escola de Comando e Estado-Maior do Exército (ECEME), as a partial requirement to obtain the title of Specialist for Politic, Strategy and Senior Military Management.

Adviser: COL. CAV. MÁRCIO **BESSA** CAMPOS

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ABSTRACT

Upon conducting a macroeconomic analysis of the impacts; both positive and negative, that the Defense-related industries have on national, regional and even local economic growth one will find that indeed there are not only direct but indirect relations throughout recent history as well as contemporary times. In 21st century nation states defense industry relationships with national governmental administrations varies upon not only the type of government but also with their historical relationships. Some defense industries may be completely privatized industries while others are completely nationalized. A third condition may be a combination of the above. Regardless of the conditions one cannot doubt the direct and indirect impacts to the economy. In the case of the United States deep in the great depression economic prosperity was only possible after United States industry mobilized for the Second World War. During the 1980s President Reagan initiated economic recovery measures coupled with a Defense Industry buildup that along with economy prosperity forged a 21st century modern armed force. Military installations have both positive and negative economic impacts based upon the level of community economic diversification to withstand periodic military downsizing. In the case of Turkey after a period of defense material procurement through foreign military sales the government established in the mid-1970s the Defense Industry Foundation succeeded by the Undersecretary of Defense Industry in the 1980s as a means to develop a national-based defense industry. Although there has been positive economic indicators of employment and technological research and development the market has been limited to truly affect at a macro level. In Argentina, which has been a industrial nation since the early 20th century has undergone challenges with a lack of consistent, clear strategic policy that is synchronized to nationalized defense industries. This synchronization shortfall has disrupted efforts at the national level and has stymied strong economic growth through employment, technological research and development brought about by national demands on the Argentine-based defense industry. The purpose of the research project is to investigate the problem proposed of economic impacts via defense industry and through a series of specific case studies an-

alyze patterns of impacts as they apply to the United States, Turkey and Argentina. Historical as well as contemporary data has been researched utilized in the course of this investigation.

Keyword: defense, defense industry, economy.

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1 INTRODUCTION

A student of National Defense strategy and Macroeconomics will have little doubt that defense industry participation has had historical and contemporary impacts to national economic development. There are at least three clearly identified economic models related to defense industry at the national level which include:

- a. Privatized or commercial sector
- b. State owned or nationalized
- c. Mixture of privatization and nationalization.

The option for either model depends on many factors, industrialization, defense spending, investment in research and development, technology availability and the degree of independence that the country wants to have from third powers.

In general we can say that defense industries in highly industrialized countries with access to local technology and significant investment in research and development will tend to be privatized. This model ensures free market competition and encourages innovation and development efforts. At the national level the state has only a controlling role mainly in regard to foreign exports to partner nations. Additionally, the high defense spending makes this production sector attractive for private investors as in the case of the United States.

In the other hand there are emerging countries with moderate or low investment in defense, poor local technology and short budget for research and development. The defense budget makes the defense industry unattractive for private investment, but the need to maintain a certain degree of independence from foreign technology imposes to the state to develop a domestic industry under its tutorial. This defense industry often faces not only the production of military equipment but also aims at the production of other strategic materials as a way to mobilize national development. This is the case of Argentina, where the government of President Cristina Fernandez has committed to the defense industry as an engine of development.

In-between can be found countries with same characteristics of both privatized and nationalized industries but who have achieved a significant potential to develop

placing them as regional leaders making the defense industry more attractive to private sector and then are in a stage of incipient private investment in defense industry.

The scope of this research will focus on the defense industries and their economic impacts in three specific countries. The United States, Turkey and Argentina. By analyzing these country-specific case studies the one will be able to determine how national economic development is impacted by the defense industry activity.

2 NATIONAL CASE STUDIES

2.1 United States Case Study

2.1.1 Overview

For the student of National Defense Strategic and Economic Studies there are many conflicting theories and political opinions on the direct and indirect impacts of the United States Defense Industry and subsidiaries as well as National Defense Spending and their combined impacts on the economy of the United States. The United States Defense Industry is a complex and multilayered entity made up of not only U.S. based industries but also smaller contracted companies that play a specific role in service and technical specialization. An in-depth economic impact analysis of contemporary U.S. based defense industry is well beyond the scope of this research. However, by conducting a historical approach and using as an investigation tool three separate case studies one can understand at the macro level how U.S. Defense Industry fueled by national defense spending has impacted the U.S. economy at not only the national level but also at selected localized areas.

The case studies in question will look at two significant historical chapters in 20th century U.S. history. These will include the Great Depression leading to U.S. involvement in the Second World War and the Reagan Administration of the 1980s that followed an era of economic despair which in short time ushered in economic prosperity throughout the end of the 20th century. Finally, the last case study will focus on localized defense economic impacts on selected U.S. cities and how these areas have not only benefited from defense spending but also have been negatively impacted by defense budget cuts, base closures and the exodus of soldiers and their families during contingency operations.

2.1.2 The Great Depression and the Second World War

On October 24, 1929 the New York stock market crash sent Wall Street into a panic. Over the next several years the United States was in the worst economic depression in its history with enormous drops in investment, consumer spending,

industrial output and high unemployment. By 1932 Industrial output was at 50%, 15 million workers (1/4 of the American Labor force) were unemployed, hundreds of banks had failed and 90,000 businesses went bankrupt.ⁱ The Administration of Franklin Delano Roosevelt ushered in a feeling of confidence with federal assistance and employment programs such as the Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA). Under the CCC 2 million able body young men between the ages of 18-25 were employed in a variety of national conservation projects such as tree planting, forest maintenance and creating fish, game and wildlife sanctuaries. In the WPA 9 million men were employed constructing bridges, roads, airports and schools.ⁱⁱ Although Roosevelt's New Deal programs did much to mitigate the social effects of the Great Depression it did not end the economic crisis. At the time of the German invasion of Poland and the European start of the Second World War the United States was still deeply mired in the economic depression. The gross domestic product was only recently exceeded in 1936 from its pre-depression level. Between 1929 and 1939 the unemployment rate averaged at 13.3%. In the summer of 1940 about 5.3 million Americans were still unemployed-far fewer than the 15 million unemployed at the pinnacle of the great depression.ⁱⁱⁱ

Even before the Japanese surprise attack on Pearl Harbor which officially entered the United States into the Second World War the American industry has already began the conversion from commercial goods to armaments and war material production for preparedness and support to the European Allies through Lend-Lease. Automobile manufactures began to convert auto assembly lines to the production of single and multiengine fighter and bomber aircraft. Merchant fleet shipyards mobilized effectively. Between 1930-1936 the entire merchant fleet industry produced only 71 ships. In 1938-1940 the number was 106 ships. The merchant fleet alone was a strategic industry that was vital to transport men and material across the Atlantic to the European War Theater.

Economic historians that are in agreement with John Maynard Keynes will often point to the Second World War as a successful case study on how Aggregate Demand pulled the United States out of the Great Depression by increased governmental demand for wartime industry and labor production. According to Keynesian economic theories:

Recessed or depressed economies can recover if the aggregate demand for goods and services increases. Production thereby also increases to meet the demand, which in turn leads to increased employment. The effect is circular, and starts with demand. As such, Keynesian economists frequently support government policies that allow the government to demand goods and services to increase aggregate demand. This is frequently known as “stimulus” policy.^v

The New Deal programs were in fact Keynesian in theory set forth by the Roosevelt administration as a means of increasing economic demand through relief programs and infrastructure projects. However, the New Deal was only a shadow of government demanded wartime production that between 1940 and 1942 increased four-fold from 1933-1939.^{vi}

It is important to note and to better clarify the Keynesian argument proposes that it is immaterial what the economy demands just as long as a significant quantity is demanded and produced to bring about a recovery. The argument to this would be that what is demanded is as much important as the quantity required for economic recovery. The aerospace industry is a prime example. The government couldn't simply go to the market and buy enough planes for the war effort; it had to create the increased industry capacity and the demand market. And it did.^{vii} In 1940 the U.S. Army Air Corps had only 28 airfields but by the end of the Second World War the Air Corps (soon to be the U.S. Air Force) had over 1,000. This enlarged aerospace industry created postwar opportunities for the continued employment of personnel.^{viii} It is important to note that in order to coordinate and increase a centrally managed industrial capacity the U.S. government under the Roosevelt administration created the Defense Plant Corporation (DPC) in 1940. The DPC committee was run by a group of well accomplice commercial

businessmen and innovators that had well established credentials. Men like future General Motors President William Knudsen who organized Ford motor company's modern production line, Vice President of Sears and Roebuck & Co.; and Ralph Budd, President of the Chicago, Burlington and Quincy Railroad.^{ix}

However, there are several critical thoughts to the common idea that it was the Roosevelt Administrations Keynesian New Deal Relief programs coupled with enormous defense spending and redirected industrial outputs for wartime material that pulled the United States out of the Great Depression and in to a post-war economic super power status. According to these opposing viewpoints the Great Depression was actually ended as a result of the end of the Second World War with sharp reductions in government spending, high taxes and regulation which is in direct opposition to the Keynesian theory

Statistical data has shown that U.S. unemployment declined at the start of the Second World War as a result of New Deal programs and industry being aligned to support the European Allies. However, it was the fact that millions of young men were now in uniform and not seeking employment in the commercial sector that was the base cause of full employment statistics during the war years.^x

Upon first look there is no doubt that there was a dramatic rise to the U.S. GDP during the war years. This is displayed below in Table 1. Critics are quick to point out that once analysis is done the statics are misleading. All the military hardware such as guns, planes, tanks, ships that were produced were counted in factoring the GDP. Material for war at an industrial level is not a true indicator of the economic goods and services that equate to a higher standard of living. These goods and services must be reflected in a voluntary market because it truly reflects what consumers are willing to pay for them. True supply and demand market based economy.^{xi}

Table 1: Federal Spending and Military Spending during World War II
(dollar values in billions of constant 1940 dollars)

Nominal GDP			Federal Spending			Defense Spending		
Year	total \$	% increase	total \$	% increase	% of GDP	total \$	% increase	% of GDP
1940	101.4		9.47		9.34%	1.66		1.64%
1941	120.67	19.00%	13.00	37.28%	10.77%	6.13	269.28%	5.08%
1942	139.06	15.24%	30.18	132.15%	21.70%	22.05	259.71%	15.86%
1943	136.44	-1.88%	63.57	110.64%	46.59%	43.98	99.46%	32.23%
1944	174.84	28.14%	72.62	14.24%	41.54%	62.95	43.13%	36.00%
1945	173.52	-0.75%	72.11	-0.70%	41.56%	64.53	2.51%	37.19%

Table-1: Federal Spending and Military Spending During World War II**Source:** Tassava, Christopher. "The American Economy during World War II".<http://eh.net/encyclopedia/the-american-economy-during-world-war-ii/>

Opponents to Keynes will point out that increased government spending really does little in truly creating economic growth and prosperity. This is simply due to the fact that money is taken out of the private sector through increased taxes or borrowing. The increased tax on companies and citizens means less disposable income to expand business or purchasing power. Increased government borrowing simply drains investment capital that would be used by the private sector and allocates it to the non-productive government consumption.^{xii}

Lastly, one would assume that if government spending and centralized defense directed industry is the key to economic growth then one would expect that once the war ended and no longer there was need for a vast, industrial defense industry there would be a return to economic recession. Millions of defense workers were being laid off and millions of soldiers were returning home to seek employment in the private sector. Critics to Keynes will point out that the 1945 and 1946 Congress passed a series of corporate and individual tax cuts which had an immediate effect not only in industry but at home as well. Corporations and Industry began to expand and citizens with more disposable income had more purchasing power to buy luxury items such as cars and home appliances. These items were now being manufactured in former defense industries that were now re-tooled for the private sector.^{xiii}

2.1.3 The Reagan Years and the 1980s

In 1979 the United States was in dire economic straits at home with a variety of economic problems that included stagnate wages, high inflation, the exodus of manufacturing jobs and unemployment. Inflation was at 11.3 % and the unemployment index moving towards 10.8 %. All the above was coupled with double-digit interest rates with the prime peaking at 21.5% by 1980.^{xiv} President Carter's foreign policy was also in serious trouble. Rising oil costs spurred by OPEC production cuts as well as

international market instability with the Soviet invasion of Afghanistan and regional conflict between Iran and Iraq meant that U.S consumers were paying more at the gasoline pump. In November 1979 Iranian militants seized the U.S. Embassy in Tehran and held hostage American citizens. An ill-fated military rescue attempt ended in disaster in the Iranian desert with the deaths of eight U.S. service members.^{xv} The United States was seen as a failing superpower both domestically and abroad. Even with numerous global security threats facing the Carter Administration was constrained by confusion and uncertainty. This included the role of the Defense Industry. Significant programs were disapproved or cancelled such as the Strategic B-1 Bomber that was to replace the aging B-52 fleet and cutbacks on Naval shipbuilding.^{xvi}

Ronald Reagan entered office in 1980 with a specific four-point economic program to reinvigorate the U. S. economy and confront the international strategic threats from the Soviet Union and their satellites. Besides tax cuts, government spending cuts, deregulation and an anti-inflationary monetary policy, the Reagan Administration through various defense industries began a military buildup that would lead to the most advanced and technically equipped defense force in the 21st century.^{xvii}

The defense industry welcomed Reagan's victory as this meant lucrative contracts to provide technically advanced military hardware and employ hundreds of thousands of workers. Industries such as Rockwell International, McDonnell Douglas, General Dynamics, Boeing, Lockheed, Rockcor, Criton, and Chrysler all would be involved in transforming the hollowed, post-Vietnam United States Armed Forces.^{xviii}

Rockwell International North American Aircraft divisions won a \$10 billion contract to build 100 B-1 bombers; previously cancelled by Carter, which would provide 14,000 new jobs in Southern California. Another policy reversal included dramatic increases in the production of tactical fighter aircraft and naval ships. \$130 billion would be spent on 6,700 tactical aircraft and the Navy would build from 500 ship surface fleet to 600 which would incorporate advanced electronic systems that was the fastest growing sub-set of the defense industry. Chrysler Corporation was developing the XM-1 main battle tank which would become the M1 Abrams. The M1 Abrams would spearhead the drive in

1990 to liberate Kuwait during the 1st Gulf War. General Dynamics as one of the leading defense contractors would provide an array of diverse defense systems such as submarines, missiles and the F-16 Fighting Falcon.^{xix}

Defense investments coupled with the afore mentioned economic policies set forth by the Reagan administration resulted in impressive recovery statistics. During the seven year period the economy grew by almost a third. That is the equivalent of adding the entire economy of West Germany; the third largest in the world at that time, to the U.S economy. By 1984 real economic growth grew by 6.8% which was the highest in 50 years. 20 million new jobs were created increasing civilian employment by 20% and dropping the rate of unemployment to 5.3% by 1989. Inflation was reduced to 6.2% in 1982 and cut in half again to 3.2 % the year later in 1983. Household disposable income increased by 18% from 1982 to 1989 which meant that the American standard of living increased by almost 20% in just seven years.^{xx}

2.1.4 Localized Defense Economical Impacts

The United States Defense Industry encompasses much more than large and well known companies like McDonnell Douglas, General Dynamics and Chrysler AMC. The Department of Defense (DoD) operates more than 420 military installations in 47 states, the District of Columbia, Guam and Puerto Rico. These installations sustain the presence of the U.S. military forces at home and abroad. In addition besides training and maintenance these installations support the military forces and their family members by providing housing, healthcare, childcare and on-base education for children. Billions of dollars are spent by the DoD to operate these installations. As a result local communities are sustained by providing employment opportunities on the installation. Military and civilian personnel spend their military wages on local goods and services. States and communities benefit from defense contracts with private companies for equipment, supplies, construction and other services such as healthcare.^{xxi}

According to a report commissioned by Enterprise Florida and Career Source Florida the DoD industry in the “Sunshine State” had a \$79.8 billion economic impact in

2014. With key Florida-based companies like Boeing and Lockheed Martin DoD industry employees number over three quarter of a million (775,000). This is a \$6.4 billion, or 8.7% increase from 2011 and ranks the defense industry as number 4 in the state. Florida is also home to 20 major military installations, three Unified Combatant Command HQs and 60,000 military personnel.^{xxii}

State	Year	Key Findings
Florida	2011 (FY 2008 Data)	<ul style="list-style-type: none"> • \$58.1 billion in gross state product, 7.5% of total • 686,181 direct and indirect jobs • In 2008, average military earnings per job were \$70,505 compared to an average of \$37,563 for all Florida jobs • Defense-related spending accounts for up to 47% of economic activity in certain counties

Table-2: Key Findings-1

Source: National Conference of State Legislators. 2015. Military's Impact on State Economies. <http://www.ncsl.org/research/military-and-veterans-affairs/military-s-impact-on-state-economies.aspx>

Known as *Military City, USA* San Antonio, Texas counts as the military being the top economic engine which produces an economic impact of \$27.7 billion. The other economic contenders include health and bioscience sector (\$24.5 billion), the financial services sector (\$20.5 billion) and the hospitality sector (\$12.2 billion). In a report by the city's economic development department showed that the DoD employed 131,963 personnel in San Antonio with more than 92,000 operating on three military bases and eight other supporting organizations that make up Joint Base San Antonio.^{xxiii} San Antonio is only one city in the state of Texas that is home to several military bases and installations. In just the state of Texas the military installations provide an economic impact of more than \$148 billion to the Texas economy which accounts for 6% of the

state's economic activity and employs more than 255,000 military and defense-related civilian personnel.^{xxiv}

State	Year	Key Findings
Texas	2012 (2012 Data)	<ul style="list-style-type: none"> • \$23 billion in DoD military expenditures • \$148 billion in total economic impact • \$83 billion in gross state product • \$55.56 billion in disposable personal income • Employ more than 255,000 military and defense-related civilian personnel

Table-3: Key Findings-2

Source: National Conference of State Legislators. 2015. Military's Impact on State Economies. <http://www.ncsl.org/research/military-and-veterans-affairs/military-s-impact-on-state-economies.aspx>

However, unlike the above mentioned examples of communities or cities that have DoD installations as a significant part of the economy but also a diversified economic field so as not to be too dependent on one sole economic sector the next example will show the negative aspects of communities that solely depend on DoD installations as the economic generator.

Fayetteville, North Carolina is home to the Fort Bragg Army Installation and Pope Field. Fort Bragg is home to the Army Special Operations Community and the XVIII Airborne Corps that includes the 82nd Airborne Division. Fort Bragg military installations have a critical impact to not only Fayetteville but the immediate region as well with a \$9.8 billion annual impact to the local economy.

Prior to the first Gulf War in 1990 local community leadership boasted of a "recession-proof" economy in that the local economy could always depend on the military purchasing goods and services. This mind-set was shattered in August 1990 when 75% of the military serving at Fort Bragg deployed to Saudi Arabia in support of

Operation Desert Shield/Desert Storm. Many military spouses left Fayetteville to return to their hometowns while their husbands were deployed for at that time an unknown time period. In Fayetteville, a city that ran on a steady diet of military payroll found itself in dire economic situations. Businesses that did not close were at the least on hard economic times.^{xxv} Currently, the city is no further along with economic diversification as what was experienced over 20 years prior. Today, under shrinking DoD budgets Fort Bragg could lose 16,000 soldiers and civilians by 2020. Further regional projections are worse with 21,563 jobs lost which would equate to a \$1 billion impact to the local economy. Local communities would lose up to \$11.3 million in estimated sales tax receipts and more than 40,000 residents would be expected to leave the local real estate market. Fayetteville is still a one-economic sector community and impacts like these equate to a major economic recession.^{xxvi}

2.1.5 Partial Conclusions

One cannot doubt that the United States Defense Industry has had significant impacts to the United States economy over the past 75 years. Although economic theorists will continue to debate on whether or not the theories of John Maynard Keynes are relevant when political leaders desire to rely on the defense industry to promote national economic growth one cannot discount that it requires a more comprehensive economic approach which includes tax incentives for business expansion and deregulation to free these businesses thus allowing for higher employment opportunities and tax base expansion that ends up as more tax revenue at the end of the fiscal year. Lastly, one can see that military installations are a significant part of local economic prosperity and opportunity. However, diversification of the economic sector is critical to withstand the periodic defense policy changes and requirements of the U.S. Armed Forces by the executive and legislative branches that will eventually impact the role of the military in the local community.

2.2 Turkey Case Study

2.2.1 General

In the literature of economics, one of the most controversial issues is if the military defense industry has an impact on economic growth and – if so- what the tendency of this impact is. As a consequence of surveys, it is argued that the military defense industry's impact on economic growth cannot be standardized. It is also underlined that there would be differences which take root from structural peculiarities in different countries.

Moving from this argument, this part of study takes a concise look at the historical development of the military defense industry in Turkey, current military defense industry models, and its economic impacts in Turkey.

2.2.2 Historical Development

Roots of Turkish Defense Industry extend to the Ottoman Empire. Especially in siege based land warfare, large and heavy canons cast in İstanbul were the most powerful weaponry of the period. This superiority of our military technology lasted until the end of 17th century. Beginning with the 18th century European military technology started to lead. With the first signs of this loss of superiority, we observed great efforts for reformation in the military. However these efforts were not satisfactory and during the First World War, the Ottoman Empire didn't have any considerable technological or industrial capability.^{xxvii}

Thus, there was no significant Defense industry infrastructure during the first years of the Republic and the endeavors were limited to the establishment of a few facilities near Ankara during the Independence War. Acknowledging that the Defense industry is a part of the overall industrialization and development, the government decided to support and guide Defense industry during the first planning period. However, despite some important ventures in ammunition, weaponry and aircraft production, a solid infrastructure could not be established due to adverse internal and external factors.

Besides administrative and financial difficulties in maintaining and improving national capabilities, scarce national resources as well as procurement policies proved insufficient to fulfill Defense equipment needs of the Turkish Armed Forces. In the post World War II era, attempts at defense production came to a complete halt as a result of foreign military aid received upon improvement of bilateral relations with the United States and Turkey's NATO membership.

Instead of improving the local Defense industry, Turkey depended on foreign aid and met its Defense requirements through and in the framework of NATO during this period of the Cold War with military and political polarization. Foreign military aid that started pouring in upon Turkey's membership in NATO and soared within a short period, stalled the development of local Defense industry which was still at its infancy.

As a result, efforts for the development of a local Defense industry slowed down; orders from Turkish Armed Forces to local suppliers diminished inevitably, and in the end military facilities became a part of the Machinery and Chemical Industry Corporation (MKEK) which was formed as a State Economic Enterprise on 15 March 1950.^{xxviii}

2.2.3 Arms Embargo and Foundation Model

However, regional problems that Turkey faced in the 1960's, Cyprus crises in 1963 and 1967, the Cyprus Peace Operation in 1974 and the arms embargo following the Peace Operation necessitated the development of a Defense industry based on national resources. In 1974 the Turkish Armed Forces Foundation was established with this understanding in mind and several investments, though limited, were initiated.

Turkish Armed Forces Foundation established companies for the production of Defense equipment such as ASELSAN (1975), İŞBİR (1979), ASPİLSAN (1981) and HAVELSAN (1982). These companies with large capital share of foundation preserved their powerful position in the Defense industry of present Turkey.^{xxix}

2.2.4 Foundation of Undersecretariat of Defense Industries and New Model

Turkey entered into a re-organization period after 1980. A number of sectors restructured in the frame of rapidly changing conditions. The Government tried to develop a model to satisfy the high technology, long period and big financial budget projects of Turkish Armed Forces. The new model developed in 1985 for this purpose had three basic features under Law No:3238:

- Defense Industry Fund was established for the financial aspect,
- Defense Industry Development and Support Organization (SAGEB) was established for the management of Defense industry projects,
- High Level Coordination Board and Defense Industry Executive Committee were formed as the decision bodies.

In 1989, SAGEB was re-organized as the Undersecretariat of Defense Industries (SSM).

In this period, big Defense industry projects such as F-16 (1987), Armed Personnel Carrier (1988), Mobile Radar Complex (1990), Electronic Warfare Equipment for F-16, HF/SSB Radios, CASA Light Transport Aircraft (1991) started. A number of Defense industry companies were established with foreign capital contribution such as TAI (1984), TEI (1985), MIKES (1987), FNSS (1988), MARCONI KOMÜNİKASYON (1989), THOMSON – TEKFEN RADAR (1990) to carry out the new projects.

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

In 1987, Turkish Armed Forces Support Foundation (TSKGV) was formed and separate foundations for Land Forces, Air Force and Navy were organized under one foundation. We must also note that after 2000, foreign shares of some of the above mentioned companies were bought by TSKGV and SSM.^{xxx}

2.2.5 Current Turkish Defense Industry Model

Over the last 30 years since its establishment, the Undersecretariat for Defense Industries has made significant achievements in building the blocks for a modern national Defense industry in Turkey, with notable results in certain vital areas. As a result of considerable dedication and efforts, key Defense industry institutions have been established to meet the requirements of the Turkish Armed Forces locally, each filling an important void in its field.

Law No:3238 ratified by the Turkish Parliament in 1985, established an institution capable of generating long term Defense policies and principles, and supplementing them with a continuous flow of financial resources. The organization founded to fulfill these functions is the Undersecretariat for Defense Industries (SSM), assigned with the major task to constitute a modern Defense industry in Turkey and to achieve the modernization of the Turkish Armed Forces. In order to attain this objective, the main principle applied by SSM is to meet military requirements through domestic suppliers in the most technically and economically feasible way possible.

In addition to introducing a totally new approach and mindset to the Turkish Defense industry, Law No:3238 also instituted a highly flexible and efficient administrative mechanism, the five main pillars of which are: Defense Industry Executive Committee, Undersecretariat for Defense Industries, Defense Industry Support Fund, Defense Industry High Coordination Council and Defense Industry Control Committee.

xxxi

2.2.6 Defense Industry Executive Committee:

The main decision making body of the system, the Defense Industry Executive Committee is chaired by the Prime Minister, and includes the Chief of General Staff and the Minister of National Defense as its members. The Executive Committee makes the critical decisions relating to Defense industry issues and major Defense procurement projects. The Committee is also required to provide nation-wide coordination between all entities regarding Defense industry. xxxii

2.2.7 Undersecretariat for Defense Industries (SSM):

The main duty of SSM, the second organization established by the Defense Industry Law, is to enact the decisions made by the Executive Committee. According to the Law, SSM has a separate legal entity, as well as its own extra-budgetary financial resources to perform the following functions:

- To carry out the decisions made 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 conduct research and development of modern arms and equipment and to have their prototypes manufactured,
- To coordinate export and offset trade issues relating to Defense industry products.

In short, the SSM is the main governing execution unit which opens tender project; evaluates the following applications; informs public and manages Defense Industry Support Fund.^{xxxiii}

2.2.8 The Defense Industry Support Fund:

The Fund, designed as the purpose-built financial instrument to enable SSM to carry out its tasks, is a highly flexible and bureaucratic formality-free mechanism with a constant flow of financial resources, fully in control of SSM. Among the main cash inflow groups are; allotments from corporate taxes fees and levies imposed on alcoholic and tobacco products, and all forms of lottery, betting and games of chance etc. Since 1986, 80% of a total of US\$11 billion was allocated to domestic production purposes, 16% to direct procurement projects and 4% to ATIP (Advanced Technologies Industrial Park) Project.^{xxxiv}

2.2.9 Defense Industry High Coordination Council:

Defense Industry High Coordination Committee is chaired by the Prime Minister and consists of Chief of Staff of Economic Affairs Officer, Minister of State, Minister of National Defense, Foreign Minister, Minister of Finance, Industry and Trade Minister, Force Commander of the Gendarmerie General Commander, Prime Ministry, State Planning Organization Undersecretary of the Treasury and Foreign Trade Undersecretary. The Council is assembled, at least twice a year, upon the invitation of the Prime Minister.

The Council is basically assigned with; following up planning and coordination and giving regulatory directives in accordance with the overall strategy approved by the Council of Ministers and determining the prescribed procurement of weapons systems with support fund and the procurement types of materials and tools with reference to the Strategic Objectives Plan prepared by Chief of General Staff.^{xxxv}

With this policy, envisaging the establishment of a national defense infrastructure, unlike past practice;

- open to the private sector,
- gained a dynamic structure,
- with export potential,
- uninteresting difficulty adapting to new technologies,
- ability to renew itself in line with technological developments,
- including NATO countries, particularly in Turkey, many other countries across the

street from issuing permanent receiver position and enabling balanced cooperation, It is intended to establish a defense.

In this context, the average rate of 40% in the joint production project completed under the project are carried out by SSM has carried out domestic development and already signed so far 60 offset contracts within the scope taken offset commitments of a total of US \$4.5 billion of the company, thus minimizing the outflow funds abroad about concrete steps have been taken.^{xxxvi}

2.2.10 Turkish Defense Industry Companies

An emphasis on the Defense industry in Turkey has many reasons. Among these, comes the goal of reducing dependence on external sources for homeland defense. Because; supplier countries in the critical period, even if we wanted to take our money and are acting in accordance with their political ambitions may prevent the supply of arms.^{xxxvii}

Another important reason; that connects the development to the industrialization of Turkey, in order to benefit from the locomotive of the defense sector is characterized by emphasizing the defense industry; it is to realize this goal.^{xxxviii}

Turkey, being a balance of peace, must have a well developed industrial structure necessary to eliminate the threat to turn to him. To maintain confidence in the independence of the country's defense industry constitutes an important part of the industrial sector, it is possible to have certain capabilities.^{xxxix}

"Top 100" is published every year by the Jane's Defense News. According to "Top 100" in 2012, ASELSAN from Turkey has achieved his current situation taken up more, and another Turkish company TAI has succeeded in joining the 100 largest defense companies in the world. According to data of 2012, Turkey defense industry has taken place among the first 15 countries in the world (Union of Turkish Chambers and Commodity Exchanges (TOBB) Turkish Defense Industry Council, Report of Turkish Defense Industry Sector-2012).

Turkish defense industry companies are gathered under one roof with all sub-sectors, Defense Industry Manufacturers Association (SASAD). The Turkish defense industry companies operating in Turkey were collected for 10 subgroups according to SASAD. (Union of Turkish Chambers and Commodity Exchanges (TOBB) Turkish Defense Industry Council, Report of Turkish Defense Industry Sector-2010)

2.2.11 Impacts of Military Defense Industry on the Economy of Turkey

Although similar aspects of the activities of the civil sector of the defense industry, advanced technology, high quality standards, a market with a limited number of buyers,

allocates be open to political influence and huge amounts of R & D and the characteristics of the defense industry as it requires investment from the others for a single product.^{xi}

The economy of the country defense industry, the scientific potential of the workforce, and the military-political-strategic concept are not possible to isolate the overall industry. The defense industry, but the overall economic structure show similar activities in other sectors of the economy as part, contains the differences arising from their nature.^{xli}

Defense spending priorities may affect the country's foreign trade export and import of weapons and equipment. Foreign trade will be affected by this process. Yet with the resources to meet domestic defense spending it can be expected to increase employment. One of the most important aspects of the use of advanced technology is evident in the defense industry. In this context, defense industry firms operating in the production of labor-intensive capital and skilled labor it employs also is natural. However, some complex and high-tech defense industries, partly requiring labor intensive production process can be done with. Therefore, it will create employment opportunities for the defense industry and also depends on the type of weapon to be produced.^{xlii}

Economic impacts of defense industry of the countries are being discussed continuously. Therefore, in this part of our study, we will try to analyze the defense industry's impact on Turkey's economy in terms of main criterias evaluating a wide range.

2.2.12 Impact on Employment

According to Sweezy and Baran, defense spending will create employment opportunities by stimulating the demand for efficiency and save the capitalist system from the recession. Working in the capitalist system before the Second World War and after examining the case, Sweezy and Baran have reached the conclusion that defense spending creates an important source of employment in the United States.^{xliii}

One of the most important features of the defense industry is using advanced technology. Due to this feature from operating in the defense industry firms making capital-intensive production and the workforce they employ qualified labor it is also quite natural. However, some complex and high-tech defense industries, partly requiring labor intensive production process can be done with. Therefore, the defense industry that will create employment opportunities also depends on the type of weapon to be produced.^{xliv}

Enhancing the employment capacity of the defense industry, the Turkish Armed Forces (TSK)'s need for outside purchases directed to the national scope of the capacity which has been created, exports performed well from the off-set commitment is effective in substantially increasing. In addition, there has been a rapid increase in the employment of qualified staff in the defense industry sector in recent years, parallel to the increase in the number of companies which are active. Newly-established and established defense industry companies continue to create new business opportunities.^{xlv}

The Chart-1 and Table-4 below, based on data gathered by SASAD (Defense Industry Manufacturers Association) and TUIK, illustrate the percentage of Turkish Defense industry's employment comparing total employment of Turkey over the years.

Chart-1: Percentage of Defense Industry Employment Per Years

Source: <http://www.tse.org.tr/tr/Default.aspx>; <http://www.sasad.org.tr/>; author.

Years	Military Defense Industry	Total	Percentage %
2008	17.841	20.604.000	0,00087
2012	33.491	23.936.000	0,00140
2013	32.368	24.601.000	0,00132
2014	31.242	25.933.000	0,00120

Table-4 : Defense Industry and Total Employment

Source : <http://www.tse.org.tr/tr/Default.aspx>; <http://www.sasad.org.tr/>; author.

According to Table-4 and Chart-1, 2008 and last three years of data compared to those employed in the defense industry and a small increase in total employment in the groove of this increase seems to have a slight positive effect.

2.2.13 Impact on Export and Foreign Trade

The general structure of Turkey's economy and this study's findings are considered together. It is possible to say that Turkey's growth in exports to the dynamic and together they contributed imports. While the contraction in the economy in the process of switching to play the dominant role of exports in the enlargement process, in our opinion, has a close relationship with periods of recession and has incurred sharp devaluation. Because of the high foreign exchange on imports and increase exports while under pressure. Again, especially exports in this period can pick up the economy with foreign exchange earning effect.^{xlvi}

The Table-5 and Chart-2 below, based on data gathered by SASAD (Defense Industry Manufacturers Association) and TUIK, illustrate the percentage of Turkish Defense industry's export comparing total export of Turkey over the years.

Years	Military Defense Industry	Total	Percentage %
2005	387.000	73.426.151	0,4589
2006	470.000	85.761.134	0,5480
2007	580.000	105.925.486	0,5474
2008	750.000	127.498.828	0,5882
2009	780.000	101.629.000	0,7674
2010	800.000	113.685.989	0,7036
2011	1.080.000	134.571.338	0,8025
2012	1.262.371	151.860.846	0,8312
2013	1.391.603	151.707.002	0,9172
2014	1.647.863	157.622.057	1,0454

Table-5 : Defense Industry and Total Export (1000 \$)

Source : <http://www.tse.org.tr/tr/Default.aspx>; <http://www.sasad.org.tr/>; author

Chart-2: Percentage of Defense Industry Export Per Years**Source:** <http://www.tse.org.tr/tr/Default.aspx>; <http://www.sasad.org.tr/>; author.

According to Table-5 and Chart-2, the rate of increase in exports of defense industry between 2014 and 2005 seems to have a positive effect on the increase of total exports.

When Table-6 is examined below, the export rate of the defense industry in 2013 compared to December 2014 according to the sectors seems to be the fifth highest rate of increase.

Sectors (1000 \$)	2013 December	2014 December	Change %
Jewel	189.189	390.234	106,3
Nuts and Grooms	166.245	321.435	93,4
Ships and Yachts	95.673	164.063	71,5
Fisheries and Livestock Products	185.163	207.956	12,3
Defense and Aerospace Industry	163.410	175.132	7,2
Carpet	202.543	215.091	6,2
Tobacco	89.628	94.615	5,6
Dried Fruits and Grooms	130.314	134.547	4
Electrical Elektronik and Services	1.113.465	1.147.586	3,1
Ferrous and Non-Ferrous Metals	572.363	587.852	2,7

Table-6: Enhance the Highest Percentage of the Top 10 Export Sectors **Source:** <http://www.tse.org.tr/tr/Default.aspx>.

2.2.14 Impact on Research and Development and Technological Development

So that they could also continue to be successful over time, the existence and benefits of the defense industrial organizations are required to have active research and development unit. Thanks to these units developing countries will be able to make progress in product development and technology adoption issues that they are having difficulties. However, R & D work done in practice is extremely costly. Therefore, the priority factor for the effective conduct of R & D efforts support for the implementation of activities and to go to this purposeful, realistic investment.^{xlvii}

The benefits to the economy of the R & D activities intended to accelerate the development of the defense industry are as follows.^{xlviii}

- More efficient use of resources,
- Prevention of brain drain and researchers exploitation of manpower,
- First, the provision of quality and standardization increase
- New investments together with the widespread use of new technologies the more effective use of existing capacity,
- Increase of competitiveness and export opportunities in foreign markets.

However, all of the technology acquired with the R & D activities for the defense; it is not suitable for use in economic and social structure.

Because some of the technologies are used in weapons production, they are quite different from those in other sectors of the economy in terms of quality. Technology implementation opportunities in other areas is very little or not at all.

The Chart-3 below, based on data gathered by SASAD (Defense Industry Manufacturers Association), illustrate the progress of Turkish Defense industry R&D Projects over the years.

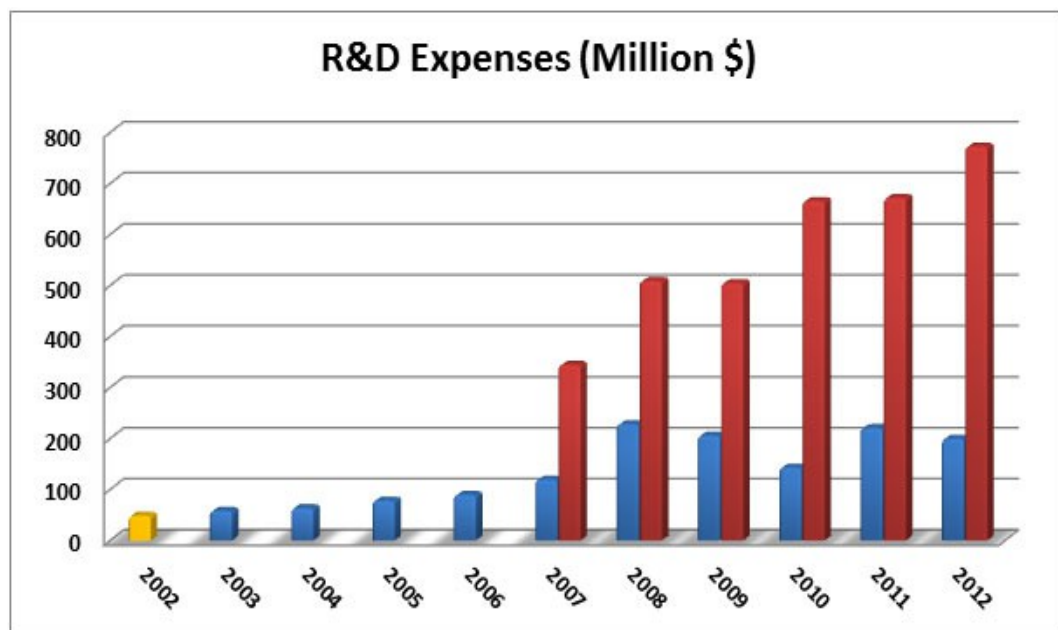


Chart-3 R&D Expenses of Defense Industry per Year

Source: <http://www.sasad.org.tr/>.

2.2.15 Impact of Industrialization

The advantage adds to the countries industrial investment in the defense industry can be summarized as follows.^{xlix}

- Goods and investment will contribute positively to the development of industry. Large and small within the weapon system has many parts. This production of parts, the manufacturing industry will provide both technology and a positive contribution to both intermediate and investment goods industry as indicated above.
- Defense industry is still not available for the establishment of industries in Turkey and will accelerate the development side of the industry. In addition, tens of thousands of pieces of weapons systems and sub-systems consisting of a large number of shows needed in many companies for the production of these parts. Thus, each new industry stimulated by the country's participation in the overall industry structure will increase the overall level of industrialization.
- Industrial companies will increase their input demands cooperation, however, excess capacity, congesting financing difficulties will be resolved within the version..
- The provision of parts and materials, the defense industry, quality and sensitivity occur in terms of standardization and also adequate quality supply industry to new technology transfers in order to supply material will play an important role in the increase of Turkey's industrial products quality and standardization.
- Skilled labor is extensively used in the defense industry. Thus, the growth of skilled labor will be provided. Production facilities and performance will improve.

2.2.16 Partial Conclusions

As with the relationship between economic growth and the defense industry, defense economics literature is dominated by two different thoughts. They are due to defense spending stimulus and externalities that influence the growth in a positive effect suggesting that the supply owned by the country-side approach to capital and transfer as an alternative to defense investment assets, it is demand-side approach advocates that the negative impact on the growth of defense spending. Also, in some studies, there was no significant impact on the growth of defense spending that has been suggested to

be a relationship between the two. Among the reasons are; experienced periods, based on a criteria, the diversity of established model for economies of scale and detection for the country are the primary ones.

In cases where the military and political situation of the country is weak and can be easily attacked, war has increased the possibility. Therefore, each country must strengthen its defenses to ensure their own safety and to reduce the possibility of war.

According to the results obtained from the above considerations, there is a very limited positive long-term relationship between the defense industry and economic developments in Turkey.

2.3 Argentina Case Study

"... I want to give special emphasis, in the recovery of the historical role of the defense industry... [] ... We want to recover the country's industrialization, and we want the defense industry seen and act as a productive industry, scientific and technological developed ...[]... in Argentina the Military Industries has been the historic engine of national industry ... [] ...today we are rebuilding FM as the pride that was once for all Argentines" (Cristina Fernandez – Argentine President – Speech addressing the country during the commemoration of the Argentine Independence Day – July 9th, 2015).

2.3.1 Introduction

The following Chart-4 shows the military expenditure (% of GDP) in Argentina according SIPRI, was last measured at 0.74 in 2013. Include all current and capital expenditures on the armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects. Such expenditures include military and civil personnel, including retirement pensions of military personnel and social services for personnel; operation and maintenance; procurement; military research and development; and military aid. Excluded are civil defense and current

expenditures for previous military activities, such as for veterans' benefits, demobilization, conversion, and destruction of weapons.

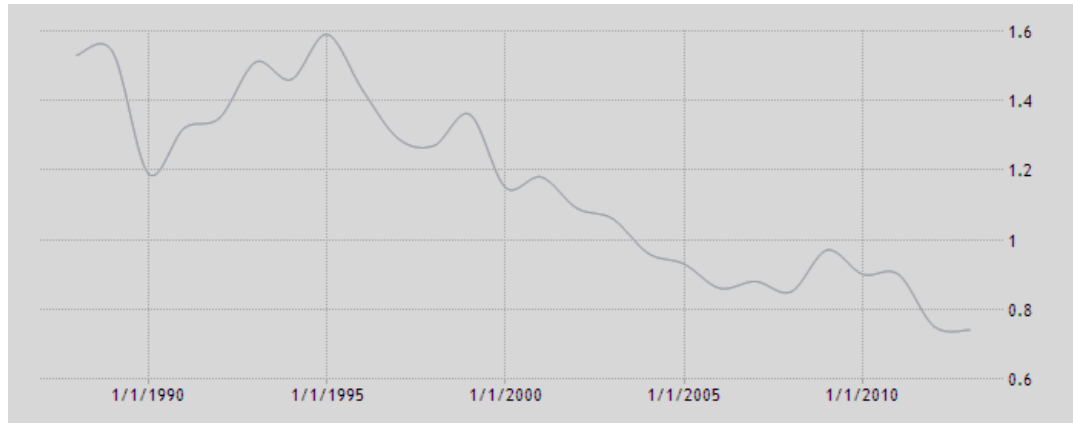


Chart-4: Military Expenditure in Argentina

Source: Stockholm International Peace Research institute, SIPRI Yearbook 2014

- However it is so difficult to find how the defense industry contribute to the national GDP, due to the lack of official and private data's on this specific topic. ¹

2.3.2 The Golden years

Technological development and industrial production for defense in Argentina was forced by the impact of World War I. The sudden interruption of trade flows at the beginning of the conflagration shows the structural vulnerability of an economic model exclusively based on commodity exports and final goods imports and brings to the scene the importance of National autonomy in this area. The Defense Industry has in Argentina a long tradition in terms of supporting and improving national economic development.

In 1922 General Enrique Mosconi founded YPF (Yacimientos Petrolíferos Fiscales), an Argentine enterprise focused in research, extraction, processing and to commercialize the oil production and its by-products. YPF is the biggest enterprise in Argentina and the 3rd largest oil factory in South America, employing more than 46,000 people Argentina wide.

In 1946 the production rate was 3.6 million m³, by 1962 was more than 15 million m³, satisfying 95% of the local demand.

Later on, Gen Manuel Nicolás Aristóbulo Savio (1892 - 1948) took the lead in the founding and development of the steel industry. He considered that the nature of armed conflict was mostly industrial and to succeed required having weapons, ammunition and equipment production capacity. Self-sufficiency was a strategic necessity.

In order to satisfy this it was necessary to have the scientific and technological knowledge to develop a military industrial complex which fostered the national industry. Additionally, an institute was created in 1931 to educate future engineers in different engineering branches and to lead the research efforts as a cornerstone of independent industrialization.

Gen Manuel Savio also imposed the National Steel Plan, and as he said "... DGFM will be the engine which will mobilize the heavy industry in Argentina ..."

As a part of this plan, in order to mobilize the steel industry, DGFM (Dirección General de Fabricaciones Militares) was created in 1938 and [SoMiSA](#) (Sociedad Mixta Siderúrgica Argentina) in 1947.

In less than seven years DGFM built twelve factories, the most important where the side-arms weapons factory FM de Armas Portátiles "Domingo Matheu" (1942), the Synthetic Toluene Factory (1942), the artillery ammunition factory FM Río Tercero (1943), the artillery ammunition factory FM "Fray Luis Beltrán" (1943), the electrical conductors factory "E.C.A." (1944), the side-arms ammunition factory FM "San Francisco" (1944), the gunpowder material factory (1945) and in 1943 Altos Hornos Zapla was created in the province of Jujuy (northwest of the country) taking advantage of the ferrous deposits existing there and producing by 1963 more than 1 million tons of steel.

During the following years the Armed Forces Institute for Scientific and Technological Research and other steel, oil and charcoal industries were funded.

By the early 1950's, the Military Aircraft Factory was one of the first in the world to manufacture jet aircraft such as the Pulqui I and Pulqui II. The latter being the predecessor of the famous Soviet Mig 15.

The DFM transformed the national economy from the agricultural pattern to an industrial pattern. From 1940 until late 50's the DGFM was the main actor in the industrialization of the country.

Regarding the Naval Sector between 1940 and 1943 stands, docks, overhauling workshops and Shipyards were constructed at the Rio Santiago Naval Base to create the National Naval Factory.

The large capacity for dual application defense industries allowed for the manufacture of automobiles and motorcycles which eventually formed the basis for the automotive and metalworking industry

However, an attempt was made to develop the production of metals, particularly copper, a critical input for the military. DGFM faced the structural difficulties of metal production in Argentina, in particular the provision of basic inputs and conflicting relationships established with private sector actors who judged pernicious the presence of a state in this particular area

In 1961, Argentina began activities in the aerospace field with the creation of the National Commission on Space Research, performing the first atmospheric studies in the southern hemisphere by developing and launching a family of one and two stage rockets with scientific payloads.

The Argentine Medium Tank Company (TAMSE) was established in 1980 and the Military Aircraft Factory was modernized becoming the most technologically advanced in Latin America.

In 1979 the Shipyard "Domecq Garcia" was founded by the initiative of the Navy, a joint stock company with majority state ownership (MoD) and the minority shareholder on the hands of the German firm Thyssen. Its main objective was to build, repair, modify and / or modernize submarines, whether domestic or foreign.

Upon the 1983 restoration of democracy in Argentina both external and internal factors hurt the national defense industry sector. On the other hand, a disconnection between policy objectives of the elected government and military projects that had emerged during the dictatorship began again demonstrating the close relationship that must exist between the scientific / technological and industrial developments from this area and government policies.

The lack of coordination between the objectives of foreign policy and military exports during these years blocked the chances of both combat vehicles and aircraft foreign military sales.

As time passes industries became inefficient due to the permanent decline in production and the discontinuity of strategic plans. This created the framework for mergers, deactivation, privatization and selloffs which dismantled the defense industry in the 1990s. Establishments failed to attract the "private interest" and were relocated under the Ministry of Economy. Without the necessary budgets to continue operating were closed.

Unfortunately, the available bibliography is not completely available on the project carried out by DGFM, and the short existing ones are focused on the steel production.

2.3.3 The New Era

With the beginning of the new millennium Argentina faced a series of transformations along the area of scientific research and technological development for defense. The transformation included the redefinition of its organizational structure, functional relationships, procedures and funding sources.

Thus, Argentina has progressively increased the levels of scientific and technological autonomy and regained productive strategic capacity of national defense capabilities.

The Argentine White Book of Defense ⁱⁱ establish the following guidelines for industry transformation:

- To integrate science and technology to the process of strategic defense planning system.
- The internal coordination of all research and development components of the defense in pursuit of efficiency, synergy and unity of purpose.
- The outer joint scientific and technological system of defense with the Scientific and Technological National System and public and private institutions through agreements, programs and projects.

The Argentine MoD's 1st step was to make a situation diagnosis, Subsequent research revealed the following results: ^{lii}

- At the beginning of the XXI century the national defense system presented a set structural dysfunction that had helped plunge the military instrument into a deep existential crisis.
- Disconnection between areas of science and technology in the Armed Forces, including the Ministry of Defense itself
- Disassociation between technological development projects and material needs of medium and long-term military instrument.
- Dismantling the defense industry. Privatization process 1990 involved the dissolution of industrial production framework that included heavy metal, portable weapons factories, combat vehicles, shipyards and aircraft production.
- In Argentina the defense industry is still owned by the state. There are no private initiatives in this area of production.
- In recent years Argentina has improved the National Industry of Defense capabilities through the integration of research and technological development and developing a science and technology system integrated to the national defense production
- Argentina also shows a recovery of the defense industry achieved through the recovery of productive capabilities of defense factories, increasing technological and industrial autonomy of the country. ^{liii}

Created in 2013, the strategic vision is provided by the Secretary of Science and technology for Defense Production, under of MoD

With the renewal and diversification of production, the defense industry in Argentina is still leading in areas where private investment does not exist or is weak. Nowadays factories owned by the state are:

- Institute of Scientific and Technical Research for Defense (CITIDEF)
- Military Industries Complex (FM)
- Argentina Aircraft Factory
- Argentine Naval Industrial Complex
- National Geographic Institute
- Naval Hydrographic Service
- National Weather Service
- INVAP (property of the Province of Rio Black)
- Army Aviation Aircraft Maintenance Battalion 601

The state conducts, regulates, develops and controls the whole defense industry. Even more, under the Law # 27.141 there is no chance for any of the listed industries to be privatized.

2.3.3.1 CITIDEF

It is a government organization under the Ministry of Defense for research and development plans, and scientific-technological programs in the field of defense industry projects.

Its mission is to transfer technology, development of prototypes and intended primarily for use by the armed forces.

2.3.3.2 Military Factories Complex (FM)

Under the MoD FM has had more than 70 years of service, since 2011 and responds to the needs of the armed forces and society with productive and technological solutions of high complexity, including construction projects wagon and three-dimensional radar installation stand.

Created in 1941 in a bid to productive sovereignty, FM became an impeller of the development in the national defense industry through its production of weapons and ammunition. At the same time, FM became the driving force for the advancement in

basic industries (steel, chemicals and petrochemicals) and also mining and railway industry productive activities.

2.3.3.3 Argentine Aircraft Factory "Brigadier San Martin"

The Argentine Aircraft Factory "Brigadier San Martin" (Fadema) is responsible for the design, manufacture and overhaul of aircraft and aircraft parts, while providing engineering services with the vision to enhancing scientific, technological and production development of the national aerospace industry. It was the first of its kind in Latin America.

Landmarks such as Pulqui I -first military jet in South America; the Pulqui II, one of the fastest jet fighters in the world that formed the basis for the design of the Soviet Mig 15, the IA 58 Pucara, close air support and light attack aircraft and the IA 63 Pampa an advanced trainer.

In 2009, after fifteen years of private management on the hands of the U.S. firm Lockheed Martin, Argentina re-acquired the company.

2.3.3.4 Argentine Naval Industrial Complex

The Argentine Naval Industrial Complex is composed by TANDANOR and Almirante Storni shipyard Industrial Complex dedicated to the construction, repair and modernization of medium and large vessels.

Among its capabilities is the biggest Syncrolift platform in the region, enabling the rise of ships up to 15,000 tons for dry dock repair.

Since the re-nationalization of TANDANOR in 2007, combining the capabilities of Admiral Segundo Storni shipyard and the upgrading of the technical capacities and human resources, the complex was in charge of the reconstruction and modernization icebreaker Almirante Irizar and the upgrade done on the submarine ARA San Juan.

2.3.3.5 National Geographic Institute

The National Geographic Institute is in charge of the development, monitoring and updating of official Argentine territory map information.

Its latest innovations are the Argentine Continuous Satellite Monitoring Network (with high accuracy-GPS positioning), the Digital Photogrammetric System, and Spatial Data Infrastructure.

2.3.3.6 Naval Hydrographic Service

The service develops digital and electronic navigational charts, warning notices to sailors, maritime weather forecasts, signals service and headlamp control.

At the regional level, it is the global coordinator of NAVAREA VI, responsible for alerting, search and rescue in the southwestern area of the Atlantic Ocean.

2.3.3.7 National Weather Forecast Service

The National Weather Forecast Service has more than 140 stations with conventional and non-conventional observation, radars, satellites and modelers for observing, understanding and predicting weather in the country and the adjacent ocean areas.

2.3.3.8 INVAP (property of the Province of Rio Negro)

Since its beginnings in the 1976, INVAP has grown from a small office to a surface area of over 10,000 square meters of laboratories, workshops and office space.

The staff comprises more than 1300 people. This includes a body of highly skilled professionals, specialized in the handling of complex systems; an advanced Quality Management System; advanced technical and administrative projects control systems and management of innovation.

Mostly thanks to INVAP, who has made an important and successful effort in the aperture of new markets. Argentina is now known worldwide as a reliable supplier of nuclear facilities, as well as of cobalt therapy and industrial automation equipment.

INVAP is the only company in South America that has worked with NASA (the U.S. National Aeronautics and Space Administration) for complete space projects. In this field, the company has shown its proficiency as constructor of satellites, payloads and ground stations.

2.3.3.9 Army Aviation Aircraft Maintenance Battalion 601

This unique army unit is not only responsible for the maintenance of all army fixed and rotary wing aircraft but also has the only workshop in South America certified by [BELL ENTERPRISES INC.](#) to upgrade the Bell UH 1 “Huey” to Bell “Huey II”.

2.3.4 Ongoing projects

2.3.4.1 Argentine Long Range Radar (3D / 2D)

The Argentine Long Range Radar, was developed by the Military Industries and INVAP, is a three-dimensional surveillance radar (measures distance, azimuth and elevation) that provides accurate location and movement data to control the airspace. High operability, low maintenance costs and high flexibility for deployment.

Support scanning electron technologies in its active antenna ("phased array"), fully solid state circuitry and digital signal processing. The antenna has adaptable electric transmission and reception, providing and adaptive field exploration.

It has a set of Electronic Counter-Countermeasures to detect and avoid all kinds of interference, such as those caused by jamming technologies. Transportable by land, water or air, it can be operated remotely and is deployable in different types of terrain and under the most diverse climatic conditions without use of cranes. In 2015, the republic of Bolivia has acquired 18 units for air space control.

2.3.4.2 Airplanes

2.3.4.2.1 FMA IA-58 Pucará

Fortress (in Quechua language) is a STOL twin-engine turboprop designed and constructed in Argentina which first flew in 1969. Its primary mission is to Close Air Support and specialized in anti-helicopters and counterinsurgency missions.

It took part in the Malvinas War in close air support missions and it was also used in counterinsurgency fight by the Colombian Air Force and the Sri Lanka Air Force.

The IA-58C ("Charlie") was equipped with 30mm cannon, two 20mm cannon, two 7.62mm machine guns and air-to-air missiles.

The IA-58E ("Echo") was projected with digital instrumental version ("glass cockpit") and more powerful engines. For now it is a detainee awaiting assigned project operational needs.

2.3.4.2.2 FMA IA 63 PAMPA

The FMA IA 63 Pampa is an advanced trainer aircraft with combat capability, produced in [Argentina](#) by [Fabrica Militar de Aviones](#) (FMA) with assistance from [Dornier](#) of [Germany](#). First deliveries occurred in April 1988

The Vought Pampa 2000, in the 1990s, LTV/[Vought](#) selected the IA 63 as the basis for the Pampa 2000, which Vought entered into the [Joint Primary Aircraft Training System](#) competition for the [United States Air Force](#). The Pampa 2000 lost to the Beechcraft/Raytheon entry which became the [T-6 Texan II](#).

The IA-63 Pampa "Phase 2". With the acquisition of FMA by [Lockheed Martin](#) the Pampa was upgraded with a new engine and a more advanced avionics package compatible with the [A-4AR](#) and weapons system. This new project was called AT-63 Pampa "Phase 2"(for attack trainer) and was marketed by Lockheed Martin.

The IA-63 Pampa GT "Phase 3", a third batch new units of the redesigned Pampa was announced by FADEA on 10 October 2013. After a long delay, finally in 2015 a prototype of the third version of the IA-63 Pampa was introduced.

2.3.4.2.3 IA 100

The IA-100 Project is the entirely (economic, industrial, intellectual) Argentine.

The production of IA-100 will represent the generation of a new production line which will promote the creation of an aerospace cluster formed by small companies subcontracted for the construction and development of various components of the aircraft.

The IA-100 is not simply intended to supply the national armed forces but also intended to take advantage of the global and regional export market.

It is a low-wing plane with fixed tricycle landing gear, full glass cockpit system, capable VFR day / night and IFR, under the influence of FAR 23 standards and MIL STD 850B.

This two-seater aircraft configuration "side by side" with a length of about 7.8m, about 2.4 meters high and close to 10mts wingspan, powered by a Lycoming 360 B1F AEIO-injection engine that delivers maximum power of 180hp, integrating a two-blade composite propeller can reach a top speed of 135 knots, a maximum ceiling of 18,000 feet and a theoretical range of 830 nautical miles. With acrobatic flight capacity has autonomous recover capabilities in situations of loss of control.

2.3.4.2.4 EMBRAER KC 390

The Argentine Aircraft Factory "Brigadier San Martin" The Argentine Aircraft Factory "Brigadier San Martin" has signed a contract with EMBRAER to provide aerostuctures to be used in the KC-390 project.

2.3.4.3 UH 1 “HUEY” Overhauling

The Huey II Modernization Program is the only OEM approved UH-1H performance upgrade available today. The Huey II combines all new commercial dynamic components with the reliable Honeywell T53-L-703 engine, leading to an increase in hover performance in hot conditions. In addition, the Huey II upgrade increases the max gross weight to 10,500 lbs, while lowering direct operating costs. With the Huey II kit installation, Bell Helicopter refurbishes the UH-1H basic airframe, provides a complete re-wire package, updates the avionics, and offers a comprehensive

selection of mission-specific kits and customizing, whether the mission is troop transport into high altitudes, medical evacuation in hot conditions, or VIP transport to and from remote bases.

2.3.4.4 Train Wagons

During 2015, Military Industries developed four different train load cars, on the basis of the new potential offered by the renewal of the national railway system. In May 2015 a contract with Ministry of Interior and Transport was signed for the construction of 1,000 new wagons to be allocated to the three freight railroads under state management.

2.3.4.5 Nuclear reactors

INVAP has long background in construction and sales Nuclear reactor for research industry and as power plants.

2.3.5 Benefits vs. Problems

2.3.5.1 Identified problems

- Lack of flexibility
- Lack or deficient of business management
- Dependence of the national budget
- Corruption and nepotism
- Low capacity for innovation
- Lack of continuity of state policy in the field of defense tends to delay projects
- Not always have an economic return

2.3.5.2 Identified Benefits

- Continuity beyond the economic result of the project
- Independence non-national actors.
- Provides a certain degree of national self-sufficiency

2.3.6 Partial Conclusion

Argentina was a pioneer in South America in the implementation of a defense industry; however, the lack of clear policies and a strategic vision, combined with a poor industrial management frustrated all efforts to do so.

Nowadays from the total Defense Industry production, only the 4% it is destined to the Argentine Armed Forces, all the rest is absorbed by the private or foreign industry.

There is in addition, a total absence of private investments on this specific area of production. Because of this, the state is forced to be in the lead of the R&D in areas in which the private initiative is still weak.

In Argentina of Defense Industry is owned by the state in a whole, especially because the low Argentine expenses in defense and the restrictions for exportation make this area non attractive for private investors.

3 CONCLUSIONS

Regardless of the defense industry management illustrated in the specific country studies one cannot refute the fact that any defense industry will not be able to contribute as an effective engine of national, regional and local economic development if it is not accompanied by strong and clearly established government policies. Moreover, it is critical that national defense spending/investments are maintained at sufficient levels to support defense industry generation of employment opportunities, technological research and development and eventually surplus material and technology that can be exported to partner nations. Disagreements with Keynesian economic theories remain even today on the validity of aggregate demand and to use Defense Industry as a principle means of economic recovery. A more comprehensive approach using the defense industry along with sound economic recovery policies appears to be the best approach to long-term prosperity.

In the case of the United States there remains little doubt that privatized defense industries has positive impacts to the United States economy in the Second World War and the Reagan years of the 1980s leading toward the new millennium. The debate on Keynesian theories is still ongoing and political leaders must decide on which economic path to pursue. Moderate deficit spending coupled with tax incentives for business growth has proven historically to be the most promising.

In the case of Turkey economic impacts have been minimal simply due to the fact of a smaller defense industry that was founded after years of dependence on foreign military sales. No doubt there have been moderately positive employment effects with manufacturing and research and development employment. However, these effects have remained negligible in the macro content of economic growth.

The greatest impact to defense industry economic development in Argentina has been the lack of clear and consistent strategic policy by the national elected administration. Without clear policy it remains a difficult task for national-based industries to generate enough output that will have the required positive employment and research and development innovations.

Lastly, the concept of defense industry is not only related to production of military material but also related to the production other services for local economic benefits. Military installations provide the best example of positive local economic impacts providing employment as well as demand for community goods and services. However, community economic diversification is key in order to withstand the inevitable ebb and flow of military budgets and force structures.

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