

Defence Economic Outlook 2018

Global Outlook with a Focus on the European Defence Industry

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Summary

While the US and its NATO allies still have a significant advantage in terms of military spending and modern equipment, major powers such as China and Russia are steadily narrowing the capability gap. However, after decades of combating terrorism and insurgencies, the US is currently increasing its capability to counter near peer competitors. Meanwhile, several European countries are striving to increase their national defence capabilities with increased military spending and investments in equipment. Following decades of stagnant or declining defence budgets, this development may present both opportunities and challenges for the European defence industry.

In order to assess the European defence industry's response to an increased demand interviews were conducted with representatives from defence companies and other stakeholders. While an increased demand was seen as positive, views on the scope and permanency of this increase varied. Identified challenges to the European defence industry include; increasing US protectionism, emerging competitors, finding skilled and educated labour, a need to support SMEs and the insufficient R&D investment. Together these factors should create added incentive for a continued or increased coordination, cooperation and consolidation within the European defence industry.

Keywords: Military expenditure, equipment quantity, defence industry, macro-economic trends, European cooperation

Sammanfattning

Medan USA och dess NATO-allierade fortfarande har ett avsevärt övertag i termer av militära utgifter och modern materiel, har stormakter såsom Kina och Ryssland stadigt minskat förmågegapet. Efter årtionden av att bekämpa terrorism and uppror ökar USA nu sin förmåga att möta kvalificerade motståndare. Samtidigt strävar flera europeiska länder efter att höja sina nationella försvarsförmågor med ökade militära utgifter och investeringar i materiel. Efter årtionden av stagnerande eller minskade försvarsbudgetar kan denna utveckling innebära både möjligheter och utmaningar för den europeiska försvarsindustrin.

För att bedöma den europeiska försvarsindustrins svar på en ökad efterfrågan genomfördes intervjuer med representanter från försvarsföretag och andra intressenter. Medan en ökad efterfrågan sågs som positivt, varierade synen på omfattningen och beständigheten i denna ökning. Identifierade utmaningar för den europeiska försvarsindustrin innefattar; en ökad amerikansk protektionism, nyttillkomna konkurrenter, att hitta skicklig och utbildad arbetskraft, ett behov av att stödja små och medelstora företag samt otillräckliga investeringar i forskning och utveckling. Till sammans borde dessa faktorer ge ytterligare incitament att fortsätta eller öka koordinering, samarbete samt konsolidering av den europeiska försvarsindustrin.

Nyckelord: *Militära utgifter, materiel kvantitet, försvarsindustri, makroekonomiska trender, europeiskt samarbete*

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Glossary

Definition of commonly used terms

Arms exports – transfer of military equipment or components to an external customer, measured in SIPRI's trend indicator value (TIV)

Arms imports – transfer of military equipment or components from an external producer, measured in SIPRI's trend indicator value (TIV)

Defence budget – budget items related to defence as defined by national budgets

Defence expenditure – spending within the defence budget as defined by national budgets

Europe – European countries, excluding Russia if nothing else stated

European defence industry – defence industry located in Europe, excluding Russia if nothing else stated

Military expenditure – direct and indirect military spending as defined by SIPRI, if nothing else stated

Modernisation – process of upgrading or replacing military equipment

Trend Indicator Value (TIV) – SIPRI's volume measure for transfers of military equipment and components

Abbreviations

EU – European Union

GDP – Gross Domestic Product

NATO – North Atlantic Treaty Organisation

PLA – People's Liberation Army

UAE – United Arab Emirates

UK – United Kingdom

US – United States

1 Introduction

The global power balance is gradually changing. While the US and its NATO allies still have a significant advantage in terms of military spending and modern equipment, major powers such as China and Russia are steadily narrowing the capability gap. However, after decades of combating terrorism and insurgencies, the US is currently increasing its capability to counter near peer competitors. Meanwhile, several European countries are striving to increase their national defence capabilities with increased military spending and investment in equipment. Following decades of stagnant or declining defence budgets, this development might present both opportunities and challenges for the European defence industry.

This report is the second in a biennial series called Defence Economic Outlook (DEO),¹ produced by the Swedish Defence Research Agency (FOI) at the request of the Swedish Ministry of Defence. The DEO report series consists of two parts; a recurring global outlook and a special theme. The theme of DEO 2018 features an analysis of the European defence industry's response to an increased demand for military equipment.

Research Objective

The aim of the DEO report series is to provide decision makers and other stakeholders within the defence sector with a global outlook on military expenditure, quantities of military equipment, defence industrial capabilities and macroeconomic trends. Focusing on major regional powers these factors should give a quantitative picture of the prerequisites for military capability. This year's edition also features an analysis of the response from the European defence industry to meet an increased demand for military equipment.

Quantitative and Qualitative Data

The security policy analysis presented in this report is based on previous research from FOI as well as other open sources. The data on military expenditure was collected from the Stockholm International Peace Research Institute (SIPRI). SIPRI's definition of military expenditure includes not only direct expenditure on armed forces, but all spending related to military activities such as paramilitary forces, military pensions as well as research and development. However, SIPRI excludes civil defence expenditure. Data on arms transfers were also collected from SIPRI. Estimates on arms transfers reflect the flow of volumes rather than the monetary value of sales. Arms transfers are therefore not denominated in USD but based on SIPRI's trend indicator value (TIV). However, for the sake of simplicity, this report refers to outwards flows of arms as exports and inward flows as

¹ For the previous report in this series see Olsson, Per & Bäckström, Peter (2016). *Defence Economic Outlook 2016 – Global Outlook with a Focus on the Baltic Sea*. FOI-R--4315--SE, November 2016, FOI: Stockholm.

imports. The data on military equipment quantities was collected from various volumes of The Military Balance series by the International Institute for Strategic Studies (IISS). FOI has compiled this data into time series and classified it into categories according to modernity. The data on macroeconomic trends was collected from the World Economic Outlook database of the International Monetary Fund (IMF).

Information regarding the European defence industry was collected through interviews with representatives from various defence companies. These were selected to give a broad European scope and represent a variety of military equipment. In order to obtain an understanding of the challenges and possibilities facing the broader materiel supply chain, a workshop was conducted with combat aircraft as a case study. The workshop included representatives from the Swedish Armed Forces, the Swedish Procurement Agency (FMV) and FOI with the aim of placing information from the defence industry interviews in the right context.

Delimitations

While military expenditure is often used to describe the global military power balance, military expenditure is an input measure which should not be equated to the output of military capability. Expenditure is however an important prerequisite for capability building. In order to move closer towards the issue of military capability, this report presents and analyses quantities of military equipment for major powers. This provides additional information concerning capability, but does not by any means offer a complete picture. Besides military expenditure and equipment quantities any comprehensive assessment of a given country's military capability should include factors such as equipment quality, training, communication, logistics, leadership, military doctrine, political goals and geostrategic position.

This report focuses on the defence economic trends of the past ten years. It also focuses on major regional powers in terms of military spending. Furthermore, the report only includes analyses of conventional forces, excluding for instance nuclear, space and cyber capabilities. The special theme regarding the European defence industry focuses on larger companies and primary producers of military equipment. The companies interviewed for this study have their headquarters located in France, the UK, Germany and Sweden.

Report Outline

Chapter 2 contains a global outlook which describes and analyses the defence economic trends of the past ten years. The chapter begins with a summary of global trends and is then divided into the regions of Europe and Russia, the Americas, Asia and Oceania, the Middle East and North Africa, and sub-Saharan Africa. Chapter 3 contains a brief description the European defence industry followed by an analysis of the European defence industry's response to an increased demand for military equipment.

2 Global Outlook

The US is by far the world's largest military spender, accounting for over one third of global spending in 2017. Second place belongs to China. While reaching just above one third of the US level, China's military expenditure exceeds the combined total of the next three largest spenders; Saudi Arabia, Russia and India.

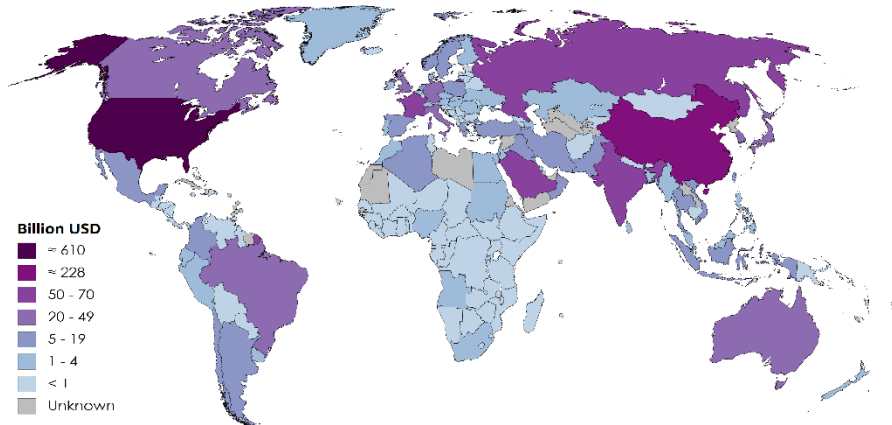


Figure 1: Global Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

Figure 1 illustrates how military spending is distributed across the globe. It shows that military expenditure is concentrated to North America, mainly the US, Western Europe and Eastern Asia, especially China and to a lesser extent India. Meanwhile, spending levels are relatively low in South America, Eastern Europe and sub-Saharan Africa. Saudi Arabia stands out as a major spender in the Middle East, as does Russia in Eastern Europe, Australia in Oceania and Brazil in South America. For more detailed data on the military spending of the world's top ten spenders, see Table A.1 in Appendix A.

Despite its long lasting dominance, the US share of global military expenditure has decreased significantly over the past decade. The US has gone from accounting for over two fifth of world total military spending in 2008 to just over one third in 2017, as shown in Figure 2. Meanwhile, China has steadily increased its military expenditure which has gone from accounting for under one sixteenth to over one eighth of the world total. Saudi Arabia and India have also increased their share of global military spending. Russia has increased its global share only slightly, but gained in ranking. In contrast, the share of the largest Western European countries has decreased over the past ten years.

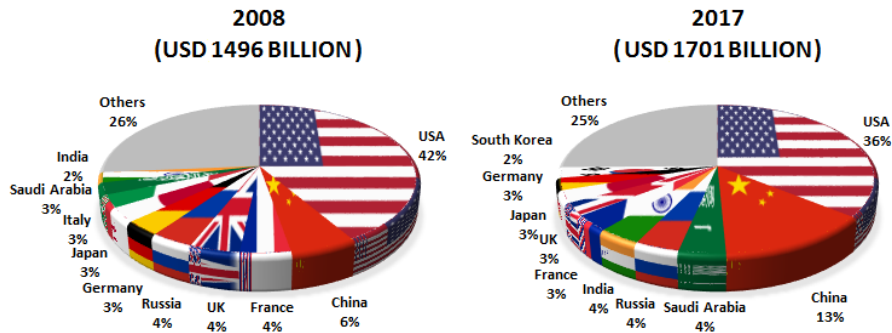


Figure 2: Share of Global Military Expenditure, 2008 and 2017 (current prices). Source: SIPRI (2018a)

In 2017, global military expenditure reached USD 1701 billion in current prices and has increased by about 7.5 percent in constant prices between 2008 and 2017. However, this increase has been unevenly distributed across the globe, as illustrated by Figure 3.

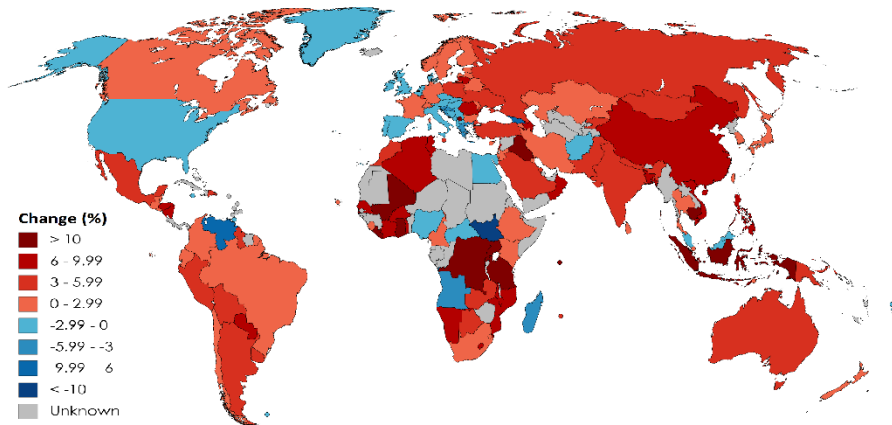


Figure 3: Annual Average Change between 2008 and 2017 (2016 constant prices). Source: SIPRI (2018a)

Most countries in the Americas have increased their military spending between 2008 and 2017. However, the US has experienced an annual average decrease during the past decade. Most of Asia has seen increased military spending during the same period. In absolute terms, China has contributed the most to this development, although other countries have experienced larger percentage increases. Russia and several other countries in Eastern Europe have also increased their military spending during the past ten years, while Southern European countries have experienced spending decreases. For Western Europe the picture is more mixed. Some

countries have increased their spending over the past decade, while others have just started to increase in recent years and still others have continued to decrease their spending. There have been increases across most of the Middle East, where Saudi Arabia is the largest spender. The picture for sub-Saharan Africa is mixed. Some countries have experienced decreases while others have increased their spending significantly, but from very low levels in absolute terms.

The long defence economic dominance of the US and Western Europe has resulted in armed forces which are more technologically advanced and have a higher degree of modern equipment than other major powers, as illustrated by the figures in Appendix B. However, this technological gap has gradually been shrinking as countries such as China and Russia have strived to modernise their armed forces. Sustained increased military spending has enabled China to rapidly modernise its military equipment. Russia has also been modernising its equipment, but to a larger extent by upgrading existing materiel. In order to support these modernisation efforts, China and Russia have improved their domestic defence industrial capabilities. Meanwhile, Saudi Arabia and India have also upgraded their armed forces, but mainly by importing modern equipment while striving to build their own domestic defence industries.

Military spending and modernisation are determined by both macroeconomic conditions and political priorities. Countries differ in their priority of defence relative to other areas of public spending, devoting different shares of gross domestic product (GDP) to their defence. But regardless of its effect on military spending, economic strength is in itself an important indicator of the global power balance.

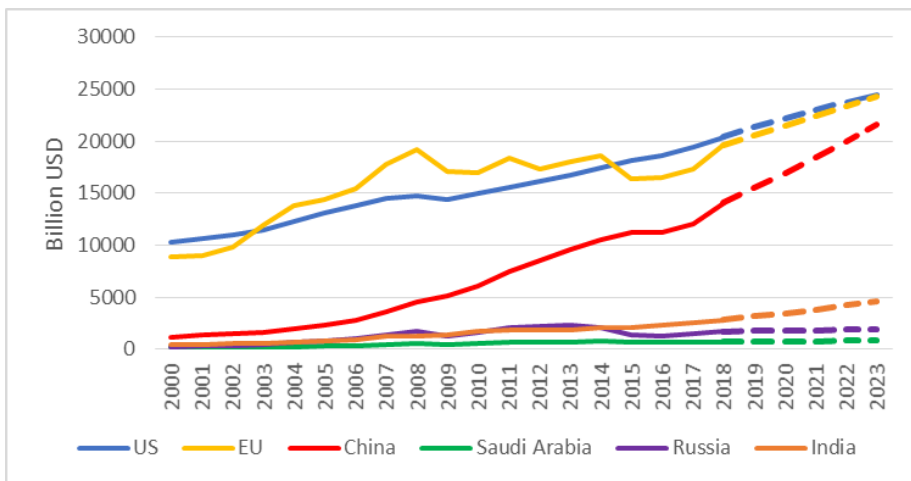


Figure 4: GDP in Nominal USD for Major Powers, 2000-2023 (current prices). Source: IMF (2018)

Figure 4 shows the economic development for major powers since 2000 with IMF forecasts for the period 2018 to 2023. Note that these projections are expressed in current prices and therefore do not take into account any impact of inflation or currency fluctuations, hence assuming that these are equal between the countries in the comparison.

The US economy has recovered steadily since the financial crisis of 2008 and the IMF projects relatively stable GDP growth rates. The EU economies were hit by both the financial crisis and the following sovereign debt crisis. But in the last few years the EU has also started to recover and this trend is projected to continue. Meanwhile, China has experienced high and sustained GDP growth rates since beginning to reform and open up its economy in 1978. Even though economic growth has slowed in the aftermath of the global financial crisis, Chinese growth rates are still projected to be strong in the coming five years, steadily narrowing the gap to the US and the EU. Russia and Saudi Arabia were hit by falling oil prices in 2014. Prices have since remained unstable and both countries have been striving to diversify their economies in order to reduce their energy resource dependency. India has experienced strong economic growth rates over the past decades, even surpassing China as the world's fastest growing major economy. However, India's economy is only about one fifth the size of China's and therefore has a long way to go before surpassing its neighbour.

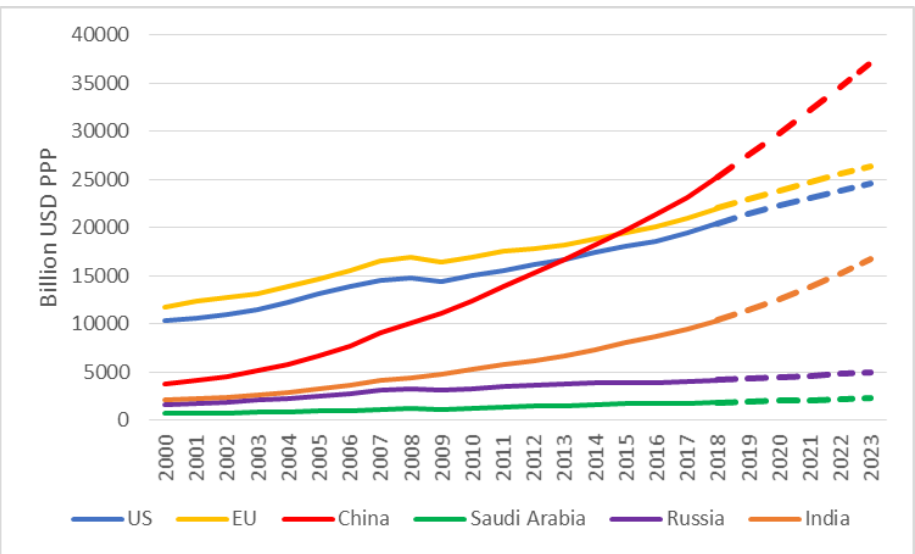


Figure 5: GDP in USD PPP for Major Powers, 2000-2023 (current prices, Purchasing Power Parity, 2011 international dollars). Source: IMF (2018)

Figure 5 shows the GDP development for major powers, but adjusted to Purchasing Power Parity (PPP). PPP-adjustment takes into account that a certain amount

of currency can purchase different amounts of goods and services in different countries. Generally, the same amount of currency has stronger purchasing power in less developed countries and weaker in more advanced economies.

When adjusting for PPP, China becomes the world's largest economy having surpassed the US in 2014 and the EU one year later. The economies of India and Russia are also significantly larger in PPP-adjusted terms compared to nominal GDP levels. The two figures above illustrate different economic aspects, but both show that economic power is shifting towards emerging Asian countries like China and India, away from the traditional Western powers.

2.1 Europe and Russia

In the past decade Russia has steadily increased military expenditure, focusing on modernising its military and equipment. However, recent signals indicate that Russia will decrease military spending in the years to come. Meanwhile, several European countries have increased or signalled increases in military expenditure in recent years.

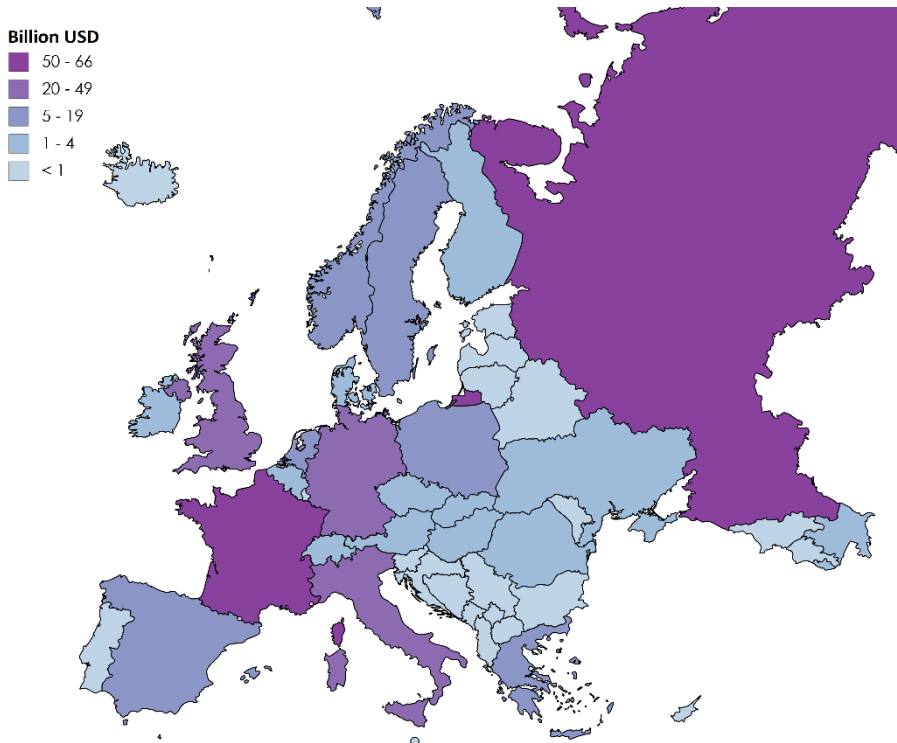


Figure 6: European Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

In 2017, Russia and France were the largest military spenders in the region followed by the UK, Germany and Italy, as illustrated by Figure 6. In the same year these five countries accounted for 71.2 percent of the region's total, as shown in Table 1.

Table 1: Top 5 Military Spenders in Europe including Russia, 2017. Source: SIPRI (2018a).

Country	Billion USD (current prices)	Share of Region (%)	Share of GDP (%)	Average Change 2008-17 (%)	Average Change 2015-17 (%)
Russia	66	19.3	4.3	4.1	-6.4
France	58	16.8	2.3	0.6	0.9
UK	47	13.7	1.8	-1.8	0.5
Germany	44	12.9	1.2	1.0	3.9
Italy	29	8.5	1.5	-1.9	6.4

Russia devoted USD 66 billion on military expenditure in 2017, amounting to 19.3 percent of regional spending and 4.3 percent of the country's GDP. This is a significantly larger percentage share of GDP compared to France, UK, Germany or Italy. Even though Russia spent a larger share of its GDP compared to France, UK, Germany and Italy, these four NATO countries together spent USD 178 billion in 2017 which is more than two and a half times as much as Russia.

Looking at the change over the past decade, Russian military expenditure has increased by an average of 4.1 percent annually. This development has mainly been driven by the ambitious modernisation effort under the State Armament Programme, GPV-2020. Recently however, it appears as if Russia has started to prioritise other public sector items. According to the three-year federal budget, Russia's defence expenditure is expected to drop from 3.1 percent of GDP in 2017 to 2.5 per cent of GDP in 2020.² Note that this data is from the Federal Budget and hence differs from SIPRI's data presented in the table above. Between 2016 and 2017, Russia's military expenditure decreased by as much as 20 percent according to SIPRI. However, this was in large part due to repayments of loans to the Russian defence industry used for the armament programme in late 2016.³ Nonetheless,

² Oxenstierna, Susanne (2019). "A New Trend in Russia's Defence Spending", in Becker, Torbjörn & Oxenstierna, Susanne (eds.). *The Russian Economy under Putin*, Routledge: Abington.

³ SIPRI (2018). *The Methodology behind SIPRI's Military Expenditure Data for Russia for 2016-17*. (Accessed 18 of October 2018).

following a long period of steady increases, Russia's military expenditure is set to continue decreasing in the coming years.

The deteriorating regional security environment, exemplified by Russia's annexation of Crimea in 2014 and subsequent military intervention in eastern Ukraine, has prompted European countries to increase their military spending in the past few years. However, European NATO countries are also under pressure to reach the goals stated in the Wales declaration that 2 percent of GDP should be devoted to military expenditure and 20 percent of expenditure should be devoted to equipment before 2024.⁴ Since US President Donald Trump took office this pressure has increased significantly.⁵ Another factor determining military expenditure is that some European countries' still conduct military operations outside the region.

In terms of absolute military spending, France is not that far behind Russia. Defence was one of the issues which President Emmanuel Macron highlighted during his election campaign. Nonetheless, the government cut the 2017 defence budget by USD 0.9 billion in order to reach the EU goal of a public deficit below 3 percent of GDP. But in 2018, the French government announced future increases in military expenditure and it aims to reach NATO's 2 percent goal in 2025.⁶ It is worth noting that while France does not reach 2 percent of GDP by NATO's definition of military expenditure, the country spent 2.3 percent in 2017 according to SIPRI. This difference is partly attributable to SIPRI's inclusion of the *Gendarmerie*.

The UK has on average decreased its military expenditure during the past ten years, but decreases have moderated in later years. Meanwhile, the UK had a more advantageous starting point than many other European countries. According to SIPRI, the UK dedicated 1.8 percent of GDP to its military in 2017, while according to NATO it reaches the alliance's goal of spending 2 percent of GDP and 20 percent on equipment.⁷ The UK Ministry of Defence has released a new military equipment plan including funding for major programmes as well as a contribution to continue meeting the goals of 2 percent of GDP on defence and 20 percent of military expenditure on equipment.⁸ However, the UK currently faces several challenges, not least financial shortcomings related to the acquisition of equipment.⁹

⁴ NATO (2014). *Wales Summit Declaration*. Press release 120, 5 September 2014. (Accessed 17 October 2018)

⁵ Rossbach, Niklas H. (2018). *Trump och amerikansk säkerhetspolitik – En analys av president Trump och hans utrikespolitiska tradition*. FOI-R--4562--SE. January, 2018, FOI: Stockholm, p. 24.

⁶ IISS (2018). "Chapter Four: Europe" in *The Military Balance 2018*, 118:1. International Institute for Strategic Studies, p. 65-168.

⁷ Estimated figure based on 2010 prices and exchange rates. NATO (2018). *Defence Expenditure of NATO Countries (2011-2018)*. Press release, 10 July 2018.

⁸ Stevenson, Beth (2018). "UK Defense Spending Faces \$9 billion hole", *Defense News*, 6 November 2018. (Accessed 30 November 2018).

⁹ Dearden, Lizzie (2018). "UK's armed forces short of up to £21bn for equipment needed over next decade, MP warn", *The Independent*, 11 May 2018. (Accessed 19 October 2018).

Germany has increased its military expenditure in the past decade, although it still accounts for just 1.2 percent of GDP. Furthermore, Germany spent around 14 percent of military expenditure on equipment in 2017.¹⁰ Consequently, the country does not reach either of the two NATO guidelines. Germany released a defence white paper in 2016 with the worsened security situation in Europe as background. It is mentioned that the *Bundeswehr* lacks resources to reach its capability goals.¹¹ Reaching the NATO guidelines is not uncontroversial in the German political debate and the current goal is to reach 1.5 percent of GDP by 2023.¹² However, given the size of the German economy, this increase will still be substantial in terms of absolute spending.

Italy was the fifth largest spender on defence in the region in 2017. As a share of GDP the country spent 1.5 percent. Over the past ten years Italy's military spending has decreased on average while for the past three years it has increased by an annual average of 6.4 percent.

Regional security

The relationship between Russia and the EU has deteriorated during the past decade, following Russia's 2008 invasion of Georgia, the 2014 annexation of Crimea and military intervention in eastern Ukraine. In response to the annexation of Crimea, the US and the EU imposed political and economic sanctions on Russia.¹³ Russia's military support for the regime of Syrian President Bashar al-Assad has done nothing to ease tensions. The Russian armed forces have also flexed their muscles in a number of recent military exercises. For instance, Vostok 2018 sent a clear message to NATO concerning Russia's ability to conduct large scale operations. This was the largest military exercise in nearly 40 years.¹⁴ An additional message of Vostok 2018 was a deepened cooperation with China, which also took part in the massive show of force.¹⁵ Russia's own security policy is driven by the fear of encirclement by NATO and so called "colour revolutions".¹⁶

¹⁰ NATO (2018). *Defence Expenditure of NATO Countries (2011-2018)*.

¹¹ Federal Government of Germany (2016). *White paper on German Security Policy and the Future of the Bundeswehr*. White Paper, 13 July 2016. Berlin.

¹² Buck, Tobias (2018). "Germany pledges to boost defence spending", *The Financial Times*, 14 May 2018. (Accessed 19 November 2018).

¹³ Oxenstierna, Susanne & Olsson, Per (2015). *The Economic Sanctions Against Russia – Impact and Prospects of Success*. FOI-R--4097--SE. September 2015, FOI: Stockholm.

¹⁴ Associated Press (2018), "Russian Military on Alert for Massive War Games Said To Be the Largest Since Soviet Games in the '80s", *Defense News*, 20 August 2018. (Accessed 8 November 2018).

¹⁵ Agence France-Presse (2018). "Russia begins its largest ever military exercise with 300,000 soldiers", *The Guardian*, 11 September 2018. (Accessed 17 October 2018).

¹⁶ Hedenskog, Jakob; Persson, Gudrun & Vendil Pallin, Carolina (2016). "Russian security policy" in Persson, Gudrun (ed). *Russian military Capability in a Ten-Year Perspective – 2016*. FOI-R--4326--SE. FOI: Stockholm, December 2016.

Meanwhile, Russia is not the only security concern facing Europe. For many European countries, terrorism is just as pressing.¹⁷ Several major European cities have experienced terror attacks over the past decades. Furthermore, many European nations are involved in operations outside of the region. France has 1,100 troops placed in the Middle East, mainly in Syria and Iraq, aiding the US-led military operations against IS. Moreover, France has 4,500 soldiers in western African partner states with the purpose of fighting armed terrorists.¹⁸ The UK also has operations abroad, for instance 1,000 troops are deployed in Afghanistan. In Iraq the UK is supporting the fight against IS with 400 soldiers.¹⁹

While priorities on security issues may vary within the EU, there have been several political initiatives for closer European cooperation. Efforts related to the EU Common Defence and Security Policy (CSDP) have taken place for decades. European Defence Agency (EDA) was founded in 2004 as an intergovernmental agency with the responsibility to coordinate EU defence issues.²⁰ However, in recent years political initiatives for closer European cooperation have intensified. 2017 saw the establishment of both the European Defence Fund (EDF) and the Permanent Structured Cooperation (PESCO).

EU cooperation efforts may have intensified, but NATO remains the most important military cooperation in the region.²¹ However, the relationship between the EU and the US has been strained since President Trump took office. After initial harsh rhetoric towards the EU from the White House on military spending and trade, a wider EU-US trade conflict seems to have been avoided. Nonetheless, steel and aluminium were hit with tariffs and the Transatlantic Trade and Investment Partnership (TTIP) is still on hold.

Other factors have also been sources of contention between the current US administration and the EU. These include President Trump's repeated praise of Russian President Vladimir Putin while criticising several European leaders, not least German Chancellor Angela Merkel, as well as the unilateral withdrawal from the Iran nuclear deal. Nonetheless, the US is still central to European security, for instance through its participation in NATO enhanced Forward Presence in Latvia, Lithuania, Estonia and Poland set up in 2016. The US budget request for 2019 means an increase in finances directed to the European Deterrence Initiative, in line with the

¹⁷ Rossbach H., Niklas; Pallin, Krister; Sundberg, Anna; Winnerstig, Mike & Lindström, Madelene (2018). "Europeisk och transatlantisk säkerhet och försvar", in Pallin, Krister (ed.). *Västlig militär förmåga – En analys av Nordeuropa 2017*. FOI-R--4563--SE. January 2018, FOI: Stockholm.

¹⁸ Ministère des Armées (2018). *Carte des opérations et missions militaires*. (Accessed 30 November 2018).

¹⁹ UK Ministry of Defence (2018). "The British Army – Operations and Deployments", *Ministry of Defence*. (Accessed 7 December 2018).

²⁰ EDA (2018). "The Birth of an Agency", *European Defence Agency*. (Accessed 4 December 2018).

²¹ Rossbach H., Niklas et al. (2018). "Europeisk och transatlantisk säkerhet och försvar", in Pallin, Krister (ed.) *Västlig militär förmåga – En analys av Nordeuropa 2017*.

US renewed focus on competition between major powers.²² The US is also an important provider of equipment as well as key components and technologies for European nations and defence industry.

Defence Industry and Equipment

The Russian defence industry is mainly owned or controlled by the state. In recent years, it has been organised into about sixty holding companies with the purpose of maintaining state control and gaining economies of scale. The Russian defence industry employs around 2 million people, a third of total manufacturing sector employment. However, it should be noted that not all production is military. Although the industry still faces several structural problems, the last decade has seen improvements in areas such as anti-corruption and workforce age structure.²³

Conditions for the Russian defence industry have also improved through the funds made available by the state armament programme. The previous programme, GPV-2020, outlined ambitious procurements for the Russian Armed Forces. Around 70 percent of the funds to GPV-2020 were dedicated to the procurement of new equipment, while the rest was directed towards maintenance as well as research and development. The programme's ambitious target was that 70 percent of all equipment should be modern by 2020, although the definition of modern has not been specified.²⁴ The successive programme, GPV-2027, was adopted in 2018 after being delayed for two years due to economic uncertainty. The new programme is not as financially ambitious as the previous one and the GPV-2027 is more focused on the ground forces compared to GPV-2020, which gave higher priority to the air and naval forces.²⁵

Russia was the world's second largest arms exporter during the period 2013-2017. The main export markets were located in Asia with India, China and Vietnam being the largest customers.²⁶ Russia's main arms exports during the period were aircraft and missiles followed by ships.²⁷ The importance of exports is likely to increase for the defence industry as domestic demand seems to be more modest under GPV-2027 compared to the previous armament programme.

After Russia's annexation of Crimea in 2014 there has been a renewed focus among Western European countries to modernise their militaries. An estimated 19

²² Judson, Jen (2018). "Funding to Deter Russia Reaches \$6.5B in FY19 Defense Budget", *Defense News*, 12 February 2018. (Accessed 5 December 2018).

²³ MalmLöf, Tomas (2017). *Rysk materielförsörjning fram till 2035 – En analys av nyanskaffning och uppgradering av befintlig materiel*. FOI-D--0795--SE, October 2017, FOI: Stockholm.

²⁴ Cooper, Julian (2016). *Russia's state armament programme to 2020: a quantitative assessment of implementation 2011-2015*. FOI-R--4239--SE, March 2016, FOI: Stockholm.

²⁵ MalmLöf, Tomas (2018). *Russia's New Armament Programme – Leaner and Meaner*. FOI Memo 6365, March 2018, FOI: Stockholm.

²⁶ Wezeman, Pieter; Fleurant, Aude; Kuimova, Alexandra; Tian Nan & Wezeman, Siemon. (2018).

"Trends in International Arms Transfers". *SIPRI Fact Sheet*, March 2018, SIPRI: Stockholm.

²⁷ SIPRI (2018b). *Arms Transfers Database*.

percent of EU military spending in 2016 was allocated to the acquisition of military equipment.²⁸ This EU figure should not be directly compared with NATO's goal of 20 percent of equipment as the definitions of equipment may vary. Furthermore, the 20 percent goal mainly concerns NATO members.

The French defence industry employs about 165,000 people.²⁹ The government has an active stake in the industry with the state either having full ownership or minority shares through holding companies in several defence companies.³⁰ France was the world's third largest arms exporter in the period 2013-2017 with the main recipients of defence related equipment being Egypt, China and India.³¹

Meanwhile, the UK defence industry employs over 300,000 people.³² British defence firms are privately owned, but the government has a veto on strategic issues. The UK has a fairly open defence industrial policy, classifying foreign owned companies operating in the UK as British. This gives them the opportunity to compete "without discrimination" for contracts from the UK Ministry of Defence.³³ The UK was the world's sixth largest arms exporter in the period 2013-2017. Main recipients at this time were Saudi Arabia, Oman and Indonesia.³⁴

The German security and defence industry employs about 137,000 people.³⁵ It is dominated by a number of industrial conglomerates, where military production is often a division within the company. Limited domestic demand has led to an increased importance of arms exports for the German defence industry. However, falling European demand and political restrictions on arms exports mainly to the Middle East have added pressure on the industry. Nonetheless, Germany was the world's fourth largest arms exporter between 2013 and 2017 with the main recipients being South Korea, Greece and Israel.³⁶

In 2017, European defence industrial cooperation gained added political momentum through the introduction of the EDF and PESCO. Though these initiatives are only in their start-up phases, they add funds, incentives and structure for cooperation on research and development as well as acquisitions. France and Germany are

²⁸ IISS (2018). "Chapter Four: Europe", *The Military Balance*.

²⁹ France Diplomatie (2018). *Defence industries and technologies*. (Accessed 17 October 2018).

³⁰ Forsström, Anna; Sundberg, Anna & Winnerstig, Mike (2013). *Europas säkerhet och försvar i en ny tid*. FOI-R--3647--SE, March 2013, FOI: Stockholm, p. 37.

³¹ Wezeman, Pieter et al. (2018), "Trends in International Arms Transfers, 2017", *SIPRI Fact Sheet*. Note that arms transfers from France to China during the period mainly consist of ship engines, see SIPRI (2018b). *Arms Transfers Database*.

³² ADS (2017). *Industry Facts & Figures – A Guide to the UK's Aerospace, Defence, Security & Space Sectors*.

³³ Uttley, Matthew R.H. & Wilkinson, Benedict (2016). "A Spin of the wheel? Defence procurement and defence industries in the Brexit debates", in *International Affairs* 92: 3, 6 May 2016. John Wiley & sons: Oxford, pp.577-578.

³⁴ Wezeman, Pieter et al. (2018), "Trends in International Arms Transfers, 2017", *SIPRI Fact Sheet*.

³⁵ BDSV (2018). *The German Security and Defence Industry*. (Accessed 18 October 2018)

³⁶ Wezeman, Pieter et al. (2018), "Trends in International Arms Transfers, 2017", *SIPRI Fact Sheet*.

the driving forces behind this development.³⁷ The two countries are also exploring development of the next generation combat aircraft, while France and Italy are likely to continue their cooperation within shipbuilding.³⁸

The EDF offers grants for European defence cooperation between member states in producing defence technology and equipment. In order to be eligible for grants the project needs to include three member states and members have to commit to buying the final product. A proportion of the budget is earmarked for projects including “cross-border participation” of SMEs.³⁹ The stated purpose of PESCO is enhanced cooperation, increased investment in defence and cooperation in developing defence capabilities. The cooperation also includes a common commitment on operational readiness. Upon the establishment in December 2017, 25 member states declared their participation.⁴⁰

This increased ambition for cooperation is partly due to the deteriorating security environment, but also a consequence of Brexit as traditional UK scepticism towards potential centralisation of European military cooperation was removed as an obstacle.⁴¹ There are however factors that may counteract the closer cooperation on defence in Europe such as the continued interest of member states to protect national capabilities. Furthermore, the negotiations regarding the UK exit from the EU are still ongoing. While it is in the interest of both parties to keep good relations, especially with regards to security and defence, Brexit may present some difficulties for deepened defence industrial cooperation in the future.

When comparing quantities of military equipment between Russia and the three major Western European powers, a very different picture emerges than when comparing military expenditure. While France, the UK and Germany together spend more than twice as much as on their militaries, Russia fields more military equipment than the other three combined. While having roughly the same number of surface combatants, Russia has over 20 percent more combat aircraft and more than twice as many main battle tanks as the three Western European powers together.⁴²

However, the significant investments made by Russia have so far only resulted in modest increases in the share of newly produced equipment. The least progress in terms of new platforms has so far been made by the navy, with only 18 out of 64

³⁷ Hagström Frisell, Eva & Sundberg, Anna (2018). *Pesco – den fortsatta utvecklingen och dess betydelse för Sverige*. FOI Memo 6397, April 2018, FOI: Stockholm.

³⁸ IISS (2018), “Chapter Four: Europe”, *The Military Balance*, p. 73.

³⁹ European Commission (2018). “Defending Europe”, *European Defence Fund*, 5 March 2018.

⁴⁰ European Commission (2018). “Deepening Defence Cooperation Among EU Member States,” *Permanent Structured Cooperation – PESCO*, November 2018.

⁴¹ Baczyńska, Gabriela & Emmott, Robin (2016), “Germany, France seek stronger EU defence after Brexit – document”, *Reuters*, 12 September 2016.. (Accessed 25 September 2018).

⁴² For more details on Russian military equipment quantities see Appendix B; Figure B.1 for surface combatants, Figure B.2 for main battle tanks and Figure B.3 for fighter and attack aircraft.

surface combatants being commissioned after 1990. For the army most of equipment in active duty is modern but with large volumes of older equipment in reserve, for instance over 10,000 main battle tanks. The Russian Air Force has the largest share of modern equipment among the Armed Force's branches with over half of fighter and attack aircrafts introduced into active service after 1990. In sum, it seems that Russia mainly has modernised its armed forces by upgrading existing platforms rather than introducing large amount of new equipment. Note that the estimates on modern equipment presented in this report differs from Russia's own assessment, see Appendix B. The difference is likely due to different definitions of the term "modern". While his report only includes new equipment, Russia may include upgraded equipment, but this has not been confirmed.

In contrast to Russia, the vast majority of the naval and air force equipment for France, the UK and Germany could be considered modern, being introduced after 1990. The three countries have reduced equipment quantities as they have modernised their armed forces, although there are differences between branches. Naval and air forces have not reduced their equipment quantities as drastically as the ground forces. For instance, the number of main battle tanks for the three countries have fallen to one fourth of the level in year 2000.⁴³

Macroeconomic Trends

The Russian economy grew steadily during the early 2000s, enabling Russia to rapidly increase its military spending. In 2009, economic growth declined significantly and since 2011 it has slowed down further. The Russian economy also suffered from the economic sanctions imposed by the US and EU as well as decreasing oil prices in 2014. But Russia's slowing economic growth is also a consequence of the long term failure to diversify the economy away from the oil and gas sector.⁴⁴ This helps to explain why growth rates started to decline even before the Western sanctions and the fall in oil prices. According to IMF projections the Russian economy might recover somewhat in the coming years with an estimated economic growth of 1.7 to 1.8 percent between 2018 and 2020. Afterwards growth is projected to be slightly lower, an estimated 1.2 percent in 2023.⁴⁵

Ten years have passed since the 2008 financial crisis which had a negative impact on several European economies. Moreover, many Southern European countries, most notably Greece, suffered from the subsequent fiscal crisis. Some countries received financial aid from other EU members on the condition of strict austerity

⁴³ For more details on French, British and German military equipment quantities see Appendix B; Figure B.4 for surface combatants, Figure B.5 for main battle tanks and Figure B.6 for fighter and attack aircraft.

⁴⁴ Oxenstierna, Susanne (2016). "Russian Military Expenditure", in Persson, Gudrun (ed.). *Russian Military Capability in a Ten-Year Perspective – 2016*. FOI-R--4326--SE. December 2016, FOI: Stockholm.

⁴⁵ IMF (2018), *World Economic Outlook Database*. (Accessed 5 December 2018).

measures. Since the crisis, the European Central Bank has successively decreased the interest rate and kept it low to help Eurozone countries out of recession. Currently, most European economies are recovering and the IMF projects a 2.2 percent real GDP growth in 2018. In the coming years growth is projected to slow down somewhat to around 1.6 percent in 2023.⁴⁶

Even though the overall economic situation has improved, many European countries still face high levels of public debt. France has ambitions of increasing military expenditure but the economic situation may slow down such efforts. France's public debt is relatively high and the country has a fairly high unemployment rate of over 9 percent. However, the economic forecast looks somewhat steady as the IMF expects France's GDP to grow by about 1.6 percent over the years 2018-2023. Meanwhile, unemployment is expected to decrease to 7.3 percent in 2023.⁴⁷

Germany's goal to spend 1.5 percent of GDP on the defence by 2023 will mean a significant addition in funds, due to the size of the German economy. An economy which is expected to slow to about 1.2 percent in 2023.⁴⁸

While the UK economy is expected to grow steadily at about 1.5 percent in the coming years, the UK leaving the EU will likely impact the UK economy as well as the economy and the security of the region as a whole. Before Brexit has been fully implemented the situation is uncertain and uncertainty may in itself affect both the economy and the regional security in a negative way. As the negotiations so far have not led to any mutual agreement there are advocates of a "no-deal" solution. This would entail the absence of a free trade agreement and that WTO rules on trade would instead apply. This situation could lead to further tariffs on goods and added protectionism.⁴⁹ There should however be in all involved parties' interest to make a smooth transition.

Italy has experienced weak economic growth since the financial crisis in 2008.⁵⁰ Following the elections in March 2018 Italy experienced both political and economic turbulence as the process of forming a new government was delayed. As the new government wanted to follow through on its pre-election promises, the presented budget entailed borrowing more than was planned by the previous government. The budget has led to uncertainties regarding budget deficits and public debt as well as confrontation with the European Commission.⁵¹

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Ibid.

⁴⁹ Partington, Richard (2018). "How has Brexit vote affected UK economy? September verdict". *The Guardian*, 27 September 2018. (Accessed 9 November 2018).

⁵⁰ IMF (2018). *World Economic Outlook Database*. (Accessed 9 November 2018).

⁵¹ Walker, Andrew (2018). "What's Behind Italy's Economic Turbulence?", *BBC News*, 5 October 2018. (Accessed 9 November 2018).

2.2 The Americas

The US is the largest military spender in the world and consequently by far the largest spender in the Americas. However, the US has a global military presence and its military expenditure should be viewed in this context. The US spent USD 610 billion on its military in 2017, as shown by Table 2.

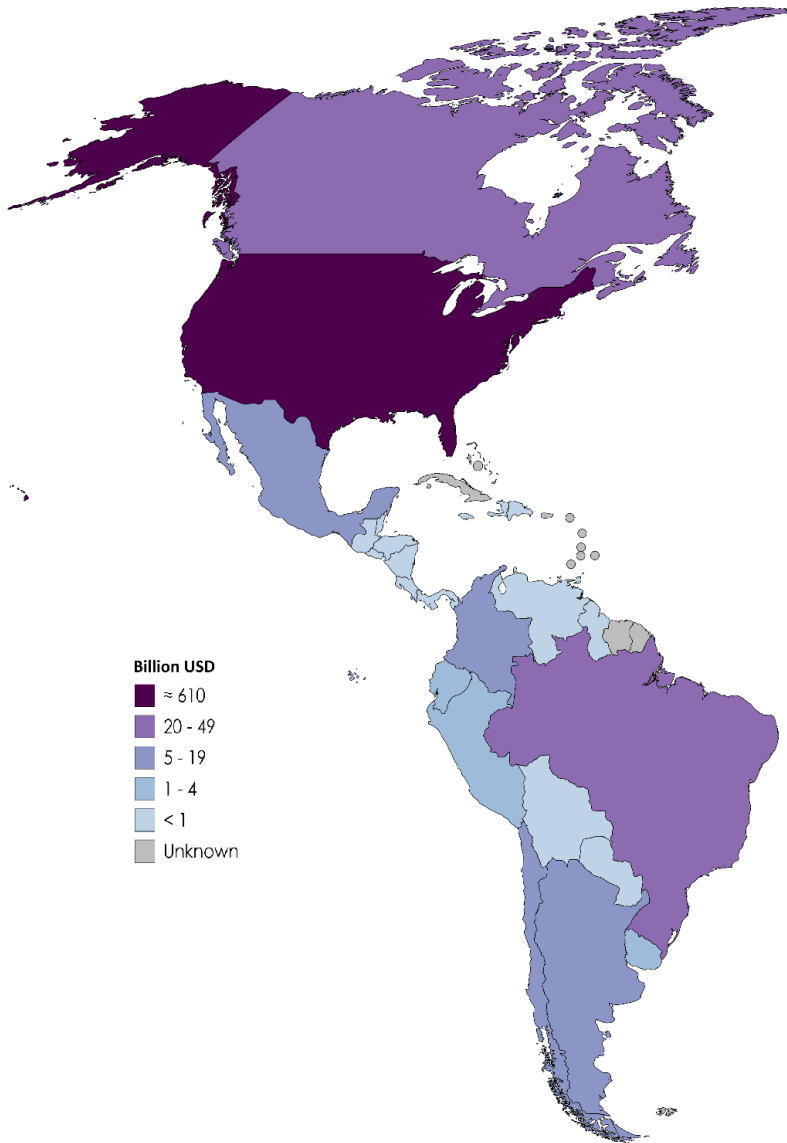


Figure 7: American Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

Even though no country has the ability to challenge US military dominance globally, the sole superpower can no longer be considered unchallenged.⁵² The US military spending has decreased on average during the past decade, but from a high level which peaked in 2011. The decrease is partly a result of the withdrawal from Iraq and the reduction of troops in Afghanistan, but also due to the budgetary restrictions in order to reduce fiscal deficits.⁵³

Table 2: Top 5 Military Spenders in the Americas, 2017. Source: SIPRI (2018a).

Country	Billion USD (current prices)	Share of Region (%)	Share of GDP (%)	Average Change 2008-17 (%)	Average Change 2015-17 (%)
US	610	87.7	3.1	-1.5	-0.5
Brazil	29	4.2	1.4	2.3	0.6
Canada	21	3.0	1.3	1.7	6.3
Colombia	10	1.4	3.1	1.6	1.0
Mexico	6	0.8	0.5	4.1	-9.5

Meanwhile, countries such as China and Russia have made significant effort to modernise their armed forces and are currently viewed by the US as near peer competitors. The decreasing capability gap has prompted the US to once again increase its military spending. According to the latest budget, the US plans to increase defence expenditure to USD 625 billion in 2020 and to keep that level between 2020 and 2023.⁵⁴ However, the White House has proposed even larger increases in the defence budget, up to USD 686 billion for the fiscal year 2019.⁵⁵ The Bipartisan Budget Act modified the discretionary spending caps even further, to USD 716 billion for 2019.⁵⁶ These increases signal a willingness to prioritise defence over other public sectors and if the realised they are large enough to impact the global trend on military expenditure, as the world total in 2017 reached USD 1,701 billion.⁵⁷

⁵² IISS (2018). "Chapter Three: North America", in *The Military Balance 2018*, p. 27.

⁵³ CSIS (2016). "What Has the Budget Control Act of 2011 Meant for Defense?", *Centre for Strategic and International Studies*, 1 August 2016. (Accessed 2018-12-07).

⁵⁴ Bergstrand, Bengt-Göran (2018). *Kraftig ökning av försvarsutgifterna i president Trumps andra budget*. FOI Memo 6388, March 2018. FOI: Stockholm.

⁵⁵ US Department of Defence (2018). *DoD Releases Fiscal Year 2019 Budget Proposal*, 12 of February. (Accessed 12 October 2018).

⁵⁶ US Senate (2018). *Department of Defence Appropriations 2018*. (Accessed 20 November 2018).

⁵⁷ SIPRI (2018a). *Military Expenditure Database*.

Brazil is the second largest military spender in the Americas. After having increased by an annual average of 2.3 percent over the past decade, the level of expenditure amounted to USD 29 billion in 2017. However, as Brazil experienced an economic recession in 2015 and 2016, the annual average increase in military expenditure for the last three years was a modest 0.6 percent. This yearly average includes a decrease between 2015 and 2016. Due to the economic situation and the subsequent decrease in military expenditure there have been cutbacks, in particular on procurement. The consequences have been cancellations and delays of military acquisitions. The order of the JAS Gripen E/F combat aircraft is still on the table though and the first delivery is expected in 2019.⁵⁸

Canada has increased its military expenditure quite rapidly in recent years, by as much as 6.3 percent on average between 2015 and 2017. Canada has committed to increase its defence budget by 73 percent the coming decade, partly due to pressure from the US.⁵⁹ Directly after Canada released its defence policy review in June 2017, the Canadian Minister of Foreign Affairs Chrystia Freeland pointed out that in order for Canada to receive backing from other nations, referring to the US, it was necessary to make significant investments in defence.⁶⁰ Moreover, Canadian Prime Minister Justin Trudeau stated in July 2018 that military spending would be prioritised to reach the NATO goal of 2 percent.⁶¹

The purpose of military expenditure and use of armed forces varies across the Americas. Whereas the US focuses on international commitments and the ability to counter near peer rivals, many Central and South American countries have historically devoted large resources to fighting internal conflicts and organised crime.

Regional Security

The US remains a global power with military presence all over the world. While President Trump has expressed general scepticism about US engagements abroad, in August 2017 the President announced that additional troops were to be sent to Afghanistan.⁶² Trump's start in office was quite turbulent with organisational problems as well as the investigations regarding Russia's involvement in the 2016 election.⁶³ Despite these impediments Trump has managed to make some significant changes with major impact on relations with other countries. Trump's foreign policy approach has diverged from previous governments and caused friction with

⁵⁸ IISS (2018). "Chapter Three: North America", *The Military Balance*. p. 4.

⁵⁹ Reuters (2017). "Canada to boost military budget by 70% after pressure from US to spend more", *The Guardian*, 7 June 2017. (Accessed 19 June 2018).

⁶⁰ IISS (2018). "Chapter Three: North America", *The Military Balance*. p. 39.

⁶¹ CBC News, "Trudeau insists Canada spending enough on defence, as Trump declares victory at NATO", *CBC News*, 12 July 2018. (Accessed 19 November 2018).

⁶² Ali, Idrees & Stewart, Phil (2017). "US to Send 3500 Additional Troops to Afghanistan", *Reuters*, 6 September 2017. (Accessed 18 October 2018).

⁶³ IISS (2018) "Chapter three: North America", *The Military Balance 2018*.

traditional allies on issues such as free trade, the Paris climate agreement and the Iran nuclear deal.

In 2017, North Korea and the US engaged in an exchange of confrontational rhetoric following fears that North Korea could develop a nuclear armed missile capable of reaching the North American mainland.⁶⁴ However, in a meeting between President Trump and North Korea leader Kim Jong-un in June 2018 an agreement was signed stating that North Korea should work towards denuclearisation. In return the US agreed to delay military exercises with South Korea. The agreement has been criticised for being too vague regarding North Korean commitments and for giving Kim Jong-un legitimacy on the world stage.⁶⁵

Central and South America have been plagued by several internal conflicts throughout history. In recent decades however internal conflicts have become far less common. In 2017, the Colombian government ended the long run struggle against the FARC with the signing of a peace treaty. Nonetheless, Colombia still faces internal conflicts such as the fight against the guerrilla group National Liberation Army. Furthermore, criminal organisations still pose a security challenge while coca production has reached record levels.⁶⁶

The economic problems in Venezuela have created tensions with neighbouring countries. Many Venezuelans have left their country and migrated to Colombia due to hyperinflation as well as food and medicine shortages. Tensions have also risen between the two countries since the former president of Colombia Juan Manuel Santos did not recognise the victory of Venezuelan President Nicolas Maduro in the latest election.⁶⁷ Maduro has also accused Santos of being at least partly responsible for a drone attack aimed at him in August 2018. The attack is claimed to be one of several attempts at a governmental change.⁶⁸

Defence Industry and Equipment

The US has the world's largest defence industry, developing and producing almost every type of equipment for all branches of the country's armed forces. The industry includes many of the world's largest defence companies, such as Lockheed Martin, Boeing, Raytheon, Northrop Grumman and General Dynamics.⁶⁹

⁶⁴ Ibid.

⁶⁵ Sullivan, Eileen (2018). "Trump Agrees: Meeting with Kim Jong-un Gave North Korean Leader 'Credibility'", *New York Times*, 15 June 2018. (Accessed 21 June 2018).

⁶⁶ US Department of Commerce (2018). *Colombia – Defence*. The US Department of Commerce International Trade Administration, 17 August 2018. (Accessed 9 November 2018).

⁶⁷ Agerholm, Harriet (2018). "Who is the Venezuelan president and why might there be a plot to assassinate him?", *The Independent*, 6 August 2018. (Accessed 7 August 2018).

⁶⁸ Herrero, Ana Venessa & Casey, Nicholas (2018). "Venezuelan President Targeted by Drone Attack, Officials Say", *New York Times*, 4 August 2018. (Accessed 7 August 2018).

⁶⁹ SIPRI (2018c). *Arms Industry Database*, May 2018. (Accessed 17 October 2018).

US military equipment can be considered fully modernised with nearly all of its equipment being produced after 1990, giving the US Armed Forces highly technologically advanced materiel. This results from the country's long history of high levels of military spending. The US Navy maintains large quantities of modern surface combatants, including 11 nuclear powered aircraft carriers, 22 cruisers, 65 destroyers and an increasing number of smaller Littoral Combat Ships. Aircraft carriers include the new Gerald R. Ford Class with electromagnetic catapult launchers while destroyers include the stealthy Zumwalt Class.

In recent years, the US Army has placed more than half of its Abrams main battle tanks in reserve while maintaining just under 2,400 in active service. The quantity of infantry fighting vehicles and field artillery has followed a similar pattern. The US Air Force has the world's largest inventory of modern combat aircraft in active service, even though the total number has been reduced by almost half since 2000. The introduction of the stealthy fifth generation F-35 is well underway.⁷⁰

Even though the US does not enjoy the same technological advantage over China and Russia as a decade ago, the country currently invests heavily in research and development in order to maintain or widen its current lead. This has materialised into the so called Third Offset Strategy. The strategy aims to maintain US military and technological dominance with the development of disruptive technologies, such as unmanned systems, human-machine interface and artificial intelligence.⁷¹

The US is the world's foremost exporter of major defence equipment. Between 2013 and 2017, the US share of global arms export amounted to 34 percent.⁷² The largest export customers were Saudi Arabia, the UAE and Australia. Besides the US no other country in the Americas is a major arms exporter. Canada and Brazil have arms industries with some exports, but these only accounted for 0.8 and 0.2 percent of global arms exports respectively during the period 2013 to 2017. Moreover, the region contains none of the world's top arms importers.⁷³

Macroeconomic Trends

Apart from being the world's largest military spender, the US is also the world's largest economy. The US economy recovered relatively quickly after suffering a downturn during the 2008 financial crisis. Economic growth was negative in 2008 and 2009 but increased 2.6 percent in 2010 and has been positive ever since. The IMF expects GDP growth to be 2.9 percent in 2018, but then to slow down to below 2 percent between 2020 and 2023. The unemployment rates following the financial crisis has also decreased steadily. In 2010, unemployment was as high as

⁷⁰ For more details on US military equipment quantities see Appendix B; Figure B.7 for surface combatants, Figure B.8 for main battle tanks and Figure B.9 for fighter and attack aircraft.

⁷¹ Ellman, Jesse; Samp, Lisa & Coll, Gabriel (2017). *Assessing the Third Offset Strategy*, Center for Strategic and International Studies, March 2017. Washington DC.

⁷² Wezeman, Pieter et al. (2018). "Trends in International Arms Transfers 2017". *SIPRI Fact Sheet*.

⁷³ Ibid.

9.6 percent, but by 2017 that rate had fallen to 4.4 percent and the IMF projects that it will be even lower in coming years.⁷⁴

Although US economic performance is strong, public debt stood at 108 percent of GDP in 2017.⁷⁵ Tax cuts under President George W. Bush, the stimulus package following the financial crisis under President Barack Obama and the costly wars in Iraq and Afghanistan have contributed to rising public debt. Furthermore, President Trump is currently embarking on an expansive macroeconomic policy. Lowering taxes has boosted the US economy further, but has also pushed public debt even higher. With high economic growth, low inflation and low unemployment, rates interest rates have gradually increased after being kept low in the years following the 2008 financial crisis. In September 2018, the Federal Reserve raised the interest rate for the eighth time since 2015.⁷⁶

At the same time the Trump administration has pursued a clear protectionist trade agenda. There have for instance been tensions with neighbouring countries Mexico and Canada due to newly imposed trade barriers on a number of products imported into the US. Lately, the US has resolved some of its trade tensions with Mexico and Canada by renegotiating NAFTA.⁷⁷ The US has also engaged in trade conflict with the EU, but above all with China. The US has imposed trade tariffs of up to 25 percent on about half of all imports from China, which has in turn retaliated with tariffs of its own.⁷⁸ The recent trade conflicts could potentially have a negative effect on American companies since prices for some important input commodities may increase. It could also impact the average American as prices on imported consumer goods increase. This could in turn put upward pressure on inflation.

Brazil has experienced a severe recession which started in 2014 and worsened in 2015. Real GDP is estimated to have dropped by 3 percent while inflation has been as high as 10 percent.⁷⁹ Besides being affected by falling prices in export commodities such as iron ore, soy beans and raw sugar, Brazil has faced a series of corruption scandals which has impacted the economy negatively.⁸⁰ The economy started to recover in 2016 and the IMF expects the Brazilian economy to recover

⁷⁴ IMF (2018). *World Economic Outlook Database*. (Accessed 12 October 2018).

⁷⁵ Ibid.

⁷⁶ BBC News (2018), "Federal Reserve Raises Interest Rates Again", *BBC News*, 26 September 2018. (Accessed 19 November 2018).

⁷⁷ Holland, Steve & Lawder, David (2018). Trump hails Canada, Mexico trade pact as win for U.S. workers. *Reuters*, 1 October 2018. (Accessed 2018-12-07).

⁷⁸ Chandran, Nyshka (2018). "US and China exchange new trade war blows as latest round of tariffs takes effect", *CNBC*, 24 September 2018. (Accessed 2018-12-07).

⁷⁹ European Central Bank (2016), "What is driving Brazil's economic downturn?" *ECB Economic Bulletin*, Issue 1/2016, pp. 16-18.

⁸⁰ CIA World Factbook (2018), *Brazil – Economy*. (Accessed 7 November 2018).

further as commodity prices are increasing once again. IMF estimates put economic growth at above 2 percent between 2019 and 2023.⁸¹ The inflation rate has also stabilized, creating room for monetary easing.⁸²

2.3 Asia and Oceania

The Asia and Oceania region has experienced significant increases in military spending during the past decade, a development which has been enabled by rapid economic growth. China is the largest military spender in the region and only the US devotes more resources to defence in a global comparison.

Table 3: Top 5 Military Spenders in Asia and Oceania, 2017. Source: SIPRI (2018a).

Country	Billion USD (current prices)	Share of region (%)	Share of GDP (%)	Average growth 2008-17 (%)	Average growth 2015-17 (%)
China	228	48.0	1.9	8.7	5.6
India	64	13.4	2.5	4.4	7.9
Japan	45	9.5	0.9	0.5	-0.2
South Korea	39	8.2	2.6	2.9	2.2
Australia	27	5.8	2.0	3.4	4.2

China's military expenditure accounts for nearly half of the Asia and Oceania region's total, exceeding that of the nearest four military spenders in the region combined, as shown in Table 3. China's military spending has increased steadily since the 1990s as the country has strived to modernise the People's Liberation Army (PLA) with the expressed goal of making it capable of fighting modern wars. Increased spending has been enabled by high and sustained economic growth rates.⁸³ China's military spending and modernisation efforts are driven by the country's wish to prevent outside powers from intervening in conflicts involving its core interests, such as Taiwan or the South China Sea. But in order to protect its growing economic interests abroad, China has also demonstrated increased capability

⁸¹ IMF (2018). *World Economic Outlook Database*. (Accessed 5 December 2018).

⁸² IMF (2018), "Western Hemisphere – Seizing the Momentum", *Regional Economic Outlook*. April 2018.

⁸³ Whereas military spending on average has increased by 8.8 percent during the last 10 years, GDP has on average increased by 8.2 percent, see IMF (2018). *World Economic Outlook Database*, April 2018.

and willingness to project power further from its own shores.⁸⁴ This development has however increased security concerns among several other countries in the region.

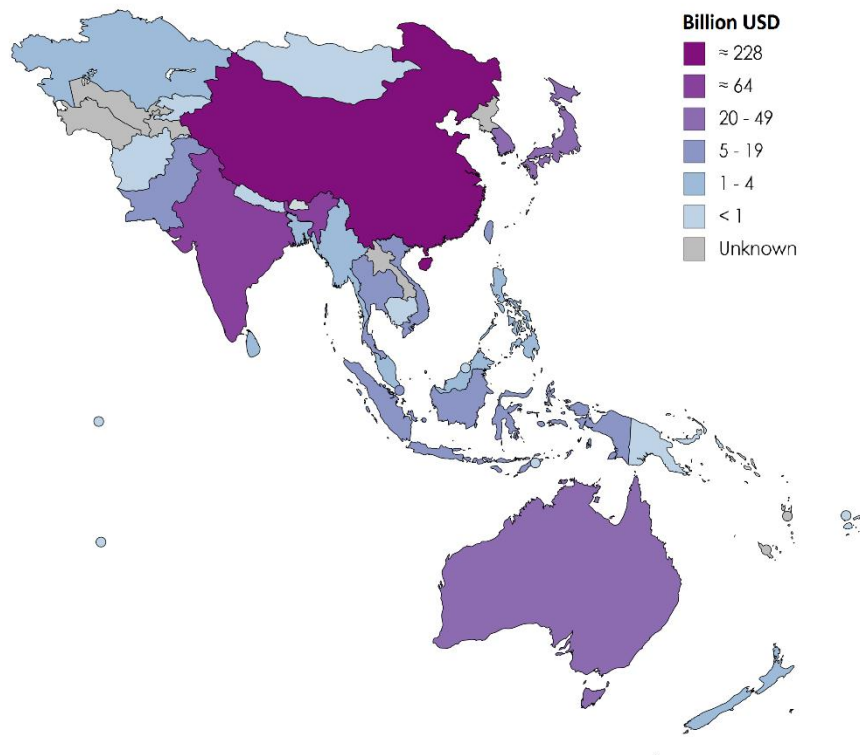


Figure 8: Asian and Oceanian Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

India's military spending is the second largest in the region and fifth largest globally. This is in large part due to the historical animosity between India and Pakistan. The other major driving force behind India's military spending is the increasing power of China, Pakistan's long term ally. India has been striving to narrow the growing capability gap with China.⁸⁵ However, the Indian army comprises of over 1.5 million personnel and there are about 2 million veterans. Consequently,

⁸⁴ Office of the Secretary of Defence (2018). *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*. Washington DC., pp. 45-47.

⁸⁵ Wilkes, Tommy (2014). "Indian firms tool up for defense orders on Modi's 'buy India' pledge", *Reuters*, 20 August 2014. (Accessed 24 July 2018).

over 60 percent of India's military spending is estimated to be spent on salaries and pensions while only 14 percent is estimated so far spent on military modernisation.⁸⁶ As part of an effort to remedy this situation, the Indian government intends to spend USD 250 billion over ten years to 2025 with a focus on modernising the armed forces.⁸⁷

Japan's military spending is the third largest in the region and eighth largest in the world, although it only amounts to 0.9 percent of the country's GDP. Since the 1970s an informal policy has prevented military spending from exceeding 1 percent of GDP. However, current Prime Minister Shinzo Abe is aiming to lift this cap to improve Japan's ability to respond to various security challenges such as China and North Korea.⁸⁸

South Korea is the fourth largest military spender in the region and has increased spending steadily during the past decade. However, as the economy also has been growing in a similar pace, military spending as share of GDP has remained roughly constant during the same period. Increases in expenditure are expected to continue. This especially if the planned spending level of USD 240 billion between 2019 and 2023, meant to support the 'Defense Reform 2.0' strategy, is realised.⁸⁹

Australia's military spending is the fifth largest in the region. The 2016 defence white paper sets a 10-year funding goal which would give an additional USD 22.9 billion in defence spending by 2026, a significant part of which will be allocated to investment in new equipment.⁹⁰ Furthermore, the Australian government expects to reach a targeted 2 percent of GDP on defence by 2021.⁹¹ Note that according to SIPRI Australia already reaches 2 percent of GDP, a difference from national statistics due to different definitions.

Regional Security

China's growing power and North Korea's nuclear ambitions have dominated security concerns in the Asia and Oceania region in recent years. China's claim to more than 80 percent of the South China Sea together with extensive construction of artificial islands to solidify these claims have triggered tensions with several

⁸⁶ Marlow, Iain (2018). "India Joins World's Top Five Defense Spenders, Surpassing France", *Bloomberg*, 2 May 2018. (Accessed 23 August 2018).

⁸⁷ Bipindra, Nc (2018). "India Moves to Reduce Its Reliance on Russia's Defense Imports", *Bloomberg*, 13 April 2018. (Accessed 31 August 2018).

⁸⁸ Fujiwara, Shinichi (2018). "LDP calls for scrapping 1% cap on Japan's defense budget", *The Asahi Shimbun*, 26 May 2018. (Accessed 24 July 2018).

⁸⁹ Yoon Sukjoon (2018). "What's Next for South Korea's 'Defense Reform 2.0' Initiative?", *The Diplomat*, 7 September 2018. (Accessed 19 October 2018)

⁹⁰ AUD 29.9 billion in 2016 exchange rate derived from SIPRI (2018). *Military Expenditure Database*.

⁹¹ Government of Australia (2016). *2016 Defence White Paper*, Department of Defence. (Accessed 20 July 2018).

maritime neighbours.⁹² In 2016, the Permanent Court of Arbitration ruled against China's maritime territorial claims in the South China Sea, in a case filed by the Philippines. The ruling has not been recognised by China nor has it deterred further construction of artificial islands.⁹³ Current Philippine President Rodrigo Duterte has since chosen a less confrontational approach towards China than his predecessors. However, China's position has also accelerated the US pivot to Asia. This has for instance been manifested by the US stepping up its so called freedom of navigation operations in the South China Sea, moves which have prompted strong condemnation from China.⁹⁴

In the East China Sea, China has revived claims on the Senkaku/Diaoyu islands under Japanese control, which has added to tensions between the two nations.⁹⁵ Increased tension in East Asia has resulted in deepened military ties between the US and its regional partners and allies. At the same time, several countries are nervous about the Trump administration's long term commitment to the region.

After a period of heightened tension between North Korea and the US, the former announced a halt to its missile and nuclear tests in April 2018.⁹⁶ Later, following a meeting between the leaders of the US and North Korea, the two countries agreed to work towards a denuclearisation of the Korean Peninsula.⁹⁷ This has temporarily reduced hostilities between North Korea and the US. However, there is no formal roadmap for the future of North Korea's nuclear disarmament and the long-term impact on diffusing tensions remains to be seen.

By mitigating the most confrontational rhetoric from the Trump administration and encouraging dialogue, South Korean President Moon Jae-In played an important role in bringing the US and North Korea back to the negotiation table.⁹⁸ The meeting between Chairman Kim Jong-un and President Trump resulted in a pause of annual US and South Korea joint military drills, a key concern for the North.⁹⁹ While pursuing peaceful engagement with the North, South Korea announced in

⁹² These include Brunei, Indonesia, Malaysia, Philippines, Taiwan and Vietnam.

⁹³ Panda, Ankit (2016). "International Court Issues Unanimous Award in Philippines v. China Case on South China Sea", *The Diplomat*, 12 July 2016. (Accessed 1 August 2018)

⁹⁴ Blanchard, Ben (2018). "China condemns U.S. for South China Sea freedom of navigation operation", *Reuters*, 2 October 2018. (Accessed 21 November 2018).

⁹⁵ Bergenwall, Samuel; Korkmaz, Kaan & Rydqvist, John (2016). *Japan's Defence and Security Policy - a Primer*. FOI-R--4249--SE, March 2016, FOI: Stockholm, p.10.

⁹⁶ BBC News (2018). "North Korea 'halts missile and nuclear tests', says Kim Jong-un", *BBC News*, 21 April 2018. (Accessed 25 July 2018)

⁹⁷ Financial Times (2018). "Trump-Kim summit: full text of the statement", *The Financial Times*, 12 June 2018. (Accessed 25 July 2018).

⁹⁸ IISS (2018). "Chapter Six: Asia", *The Military Balance*, p. 221.

⁹⁹ BBC News (2018). "What are the US-South Korea war games?", *BBC News*, 30 August 2018. (Accessed 6 November 2018)

July 2018 the intent to develop an army even more capable of responding to the threat posed by North Korea, as part of the ‘Defense Reform 2.0’ strategy.¹⁰⁰

Meanwhile, Japan is in the process of revising its pacifist constitution with reference to security concerns raised by North Korea and China.¹⁰¹ For instance, in 2015 Prime Minister Abe’s government managed to achieve a reinterpretation of Article 9 of the country’s constitution which enables the Self-Defence Forces to engage beyond Japan’s borders.¹⁰²

It is important to keep in mind that the US is also central to the security environment of the Asia and Oceania region given its large presence and various regional partnerships. These include South Korea, Japan, Australia and the Philippines. Furthermore, the US support for Taiwan is a key concern for China which views the island as a runaway province.¹⁰³

Despite some recent diplomatic progress in the region, the remaining challenges and rapidly changing power dynamics in the Asia and Oceania region will likely complicate efforts to reduce tension in the near future.

Defence Industry and Equipment

China’s mainly state owned domestic defence industry has matured significantly over the past decades, steadily enabling the country to reduce its reliance on foreign military equipment. This development has both supported and been supported by the rapid modernisation of the PLA.

In terms of equipment, China has given priority to its navy, reflecting the country’s maritime security concerns. During the last ten years, the PLA Navy has commissioned nearly 40 corvettes, 20 frigates and a dozen destroyers, all domestically produced. Overall, about 69 percent of the PLA Navy’s surface combatants could currently be considered modern.¹⁰⁴ In May 2018, China’s first domestically constructed aircraft carrier began sea trials and it may join the refurbished ex-soviet carrier *Liaoning* as soon as 2020.¹⁰⁵ In July the same year, the third and fourth

¹⁰⁰ Republic of Korea Ministry of National Defense (2018). *Defense Reform*. (Accessed 6 November 2018)

¹⁰¹ Sieg, Linda (2018). “Japan’s Abe avoids timeline for amending pacifist constitution”, *Reuters*, 22 January 2018. (Accessed 25 August 2018).

¹⁰² Bergenwall, Samuel, et al. (2016). *Japan’s Defence and Security Policy - a Primer*, pp. 19-20.

¹⁰³ Brookings (2016). *Alliances & partnerships: U.S. commitments in the Asia-Pacific*, 13 July 2016. (Accessed 3 December 2018).

¹⁰⁴ For more details on Chinese military equipment quantities see Appendix B; Figure B.10 for surface combatants.

¹⁰⁵ Connor, Neil (2018). “China’s first home-built aircraft carrier begins sea trials as Beijing ramps up its maritime might”, *The Telegraph*, 13 May 2018. (Accessed 2 August 2018).

Type 055 destroyers were launched. When these surface combatants enter service they will be among the largest and most heavily armed in the world.¹⁰⁶

The PLA Air Force has also been prioritised. With 43 percent of combat aircraft belonging to the more modern fourth and fifth generations, this may not be as clearly reflected as with the navy.¹⁰⁷ However, China's air force has reached some significant milestones in recent years. For instance in 2018, when the first batch of J-20 fifth generation multirole fighters entered service.¹⁰⁸ Meanwhile, about 50 percent of main battle tanks could be considered modern. The ground forces have also received new attack helicopters, infantry fighting vehicles and long range rocket artillery. Moreover, China has focused on developing advanced anti-air and anti-surface guided missiles as well as various ballistic missiles.¹⁰⁹

A more capable defence industry has enabled China to become the world's fifth largest arms exporter between 2013 and 2017.¹¹⁰ Pakistan has historically been the main recipient of China's arms exports, accounting for 35 percent during the last five years. Bangladesh, Myanmar and Algeria were other major importers of China's defence equipment during the same period.¹¹¹

Despite the progress made by its defence industry, China still relies on the import of some key technologies, especially from Russia. For instance, the PLA received the first S-400 air defence system in 2018 and is scheduled to receive the final delivery of the 24 Su-35 fighter aircraft the same year.¹¹² China has long struggled with the development of combat aircraft engines and imports of fighter aircraft from Russia could be seen in this context.

India has been the world's largest importer of arms during the period 2013 to 2017.¹¹³ This reflects some of the shortcomings within the domestic arms industry. In order to boost the Indian defence industry, the government introduced a new procedure in 2016 for procuring military equipment as part of the 'Make in India'

¹⁰⁶ Lendon, Brad (2018). "China's new destroyers: 'Power, prestige and majesty'", *CNN*, 14 July 2018. (Accessed 12 October 2018).

¹⁰⁷ For more details on Chinese military equipment quantities see Appendix B; Figure B.11 for main battle tanks and Figure B.12 for fighter and attack aircraft.

¹⁰⁸ Blanchard, Ben (2018). "China says new stealth fighter put into combat service", *Reuters*, 9 February 2018. (Accessed 23 August 2018)

¹⁰⁹ Office of the Secretary of Defence (2018). *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*, s. 59-63.

¹¹⁰ Wezeman, Pieter, et al. (2018), "Trends in International Arms Transfers, 2017", *SIPRI Fact Sheet*. (Accessed 23 August 2018).

¹¹¹ SIPRI (2018b). *Arms Transfers Database*. May 2018.

¹¹² See Gady, Franz-Stefan (2018). "Russia Delivers 1st S-400 Missile Defense Regiment to China", *The Diplomat*, 3 April 2018 and Gady, Franz-Stefan (2018). "Russia to Deliver 10 Su-35 Fighter Jets to China in 2018", *The Diplomat*, 29 May 2018. (Accessed 20 July 2018).

¹¹³ India's share of global arms imports was 12 percent during the period 2013-2017, see Wezeman, Pieter et al., (2018), "Trends in International Arms Transfers". *SIPRI Fact Sheet*. (Accessed 23 August 2018).

initiative. The goal is to achieve increased technology transfers in connection with procurement from foreign companies and joint ventures.¹¹⁴ If realised this would mean a departure from past development as India's defence industry has so far neither succeeded in meeting the needs of the country's own armed forces nor in becoming a major player on the arms export market.¹¹⁵

Due to a set of strict export rules, Japan's defence industry has relied on demand from the country's own Self-Defense Forces. The transfer of defence equipment and technology to some destinations was restricted in the late 1960s. New guidelines passed in the late 1970s further restricted arms exports, independent of destination. Japan however loosened restrictions on arms exports in 2014, enabling arms transfers and international cooperation within the defence sector.¹¹⁶ This change in policy has already resulted in defence industrial cooperation with for instance the UK, France, and Australia. However, Japan's export ambitions may face challenges due to the defence industry's inexperience in international negotiations and more expensive products compared to competitors.¹¹⁷ Nonetheless, the ability to export is likely to benefit the domestic defence industry.

In the last decades South Korea has emerged as an advanced defence industrial nation able to serve its armed forces and steadily expand to export markets.¹¹⁸ Seven of the companies that featured among the top 100 defence companies in 2016 were South Korean. Increased sales in recent years can mainly be attributed to acquisitions by the own armed forces, stemming from heightened security concerns.¹¹⁹ The South Korean defence industry has for instance produced the advanced K2 Black Panther main battle tank and the K9 self-propelled howitzer.¹²⁰ The latter has been exported to Finland, Estonia and Norway.¹²¹ While there are further prospects of success in the export market, the South Korean defence industry still relies on US and other Western countries for many components.

¹¹⁴ Stocker, Joanne (2018). "India's defense spending to increase over 7.8% in 2018", *The Defense Post*, 1 February 2018. (Accessed 19 July 2018).

¹¹⁵ Marlow, Iain (2018). "India Wants the World to Buy Its Weapons. They're Not Very Good", *Bloomberg*, 31 January 2018. (Accessed 19 July 2018).

¹¹⁶ Japanese Ministry of Defence, (2014). *Strategy on Defense Production and Technological Bases Toward strengthening the bases to support defense forces and 'Proactive Contribution to Peace'*, June 2014, pp. 2-5.

¹¹⁷ Bergenwall, Samuel et al. (2016). *Japan's Defence and Security Policy – a Primer*, pp. 26-36.

¹¹⁸ Falrey, Robert (2018). "How Far Can South Korea's Indigenous Defense Industry Go?", *The Diplomat*, 23 August 2018. (Accessed 6 November 2018).

¹¹⁹ Fleurant, Aude; Kuimova, Alexandra; Tian Nan; Wezeman, Pieter & Wezeman, Siemon (2017). "The SIPRI top 100 arms producing and military services companies, 2016", *SIPRI Fact Sheet*, December 2017.

¹²⁰ Gady, Franz-Stefan (2017). "North Korea Threat Sparks Record Arm Sales in South Korea", *The Diplomat*, 12 December 2017. (Accessed 6 November 2018).

¹²¹ Yeo, Mike (2017). "Norway orders K9 howitzers in latest win for South Korean arms industry", *Defense News*, 20 December 2017. (Accessed 21 November 2018).

Macroeconomic Trends

The economy of the Asia and Oceania region has been growing steadily for decades and remains the foremost driver of global economic growth, which can largely be attributed to China and India.¹²² The two countries have had an average annual growth rate of 7 percent during the past ten years.¹²³

However, China's once astonishing economic growth rates have slowed significantly during the past decade, from double digit in the decade before the 2008 financial crisis to between 6 and 7 percent afterwards. According to IMF forecasts real economic growth is expected to continue slowing, to below 6 percent in 2022.¹²⁴ This is partly due to the fact that mature economies tend to grow slower. It is also a result of the conscious efforts by the Chinese government to shift focus from high speed growth to high quality growth with a more equally distributed, efficient and balanced economy. There has been some progress in this regard as the service sector and final consumption have been claiming larger shares of GDP, although infrastructure investment and foreign demand for manufactured goods remain important. However, the slowdown in growth is also a resulting backlash from the massive stimulus package launched after the global financial crisis.

Since the financial crisis the Chinese economy has been supported by public spending and credit from state controlled banks. This has caused total debt levels to surge, estimated at more than 250 percent of GDP in 2017.¹²⁵ These levels are high for a middle income country and trying to manage them will likely have a negative impact on growth for years to come. But China may not have much of a choice. The IMF has warned that high debt levels may threaten the country's economic stability if left unchecked.¹²⁶ On top of this China has become embroiled in a trade war with the US. The Trump administration has so far imposed tariffs on about half of all Chinese exports to the US, accusing China of unfair trade practices. China in turn has threatened to retaliate at every step. As the US has demonstrated increased scepticism towards international trade agreements, China has portrayed itself as a guarantor of free trade and globalisation.¹²⁷ The ambitious Belt and Road Initiative introduced in 2013 may boost China's economy through the promotion of trade and investment, but also increase its global influence.

India has experienced impressive economic performance in recent years, with real economic growth rates surpassing those of China. While Indian growth has pri-

¹²² IMF (2018). "Asia Pacific", *Regional Economic Outlook*, April 2018, p.3.

¹²³ IMF (2018), *World Economic Outlook Database*, April 2018. (Accessed 2018-08-01)

¹²⁴ Ibid.

¹²⁵ IMF (2018). "The People's Republic of China". *IMF Country Report*, No. 18/240.

¹²⁶ Chen, Sally & Shik Kang Joong (2018), "Credit Booms – Is China Different?", *IMF Working Paper*, WP/18/2, January 2018.

¹²⁷ Hellström, Jerker (2018). *Asien – ett nytt maktcentrum, Anförande vid Rikskonferensen 2018*, FOI Memo 6327, January 2018. FOI: Stockholm.

marily been driven by the service sector, Prime Minister Narendra Modi's government hopes to strengthen the industrial sector through the 'Make in India' initiative. Although industrial production has grown steadily in recent years, manufacturing as share of GDP has remained quite stable during the past decade.¹²⁸ A standardised goods and services tax was introduced in 2017 with the expectation to encourage economic activity and increase tax revenue.¹²⁹ The IMF expects the Indian economy to continue performing well with average growth projected at 7.9 percent between 2018 and 2023.¹³⁰

Japan's economy is arguably the most advanced and mature in the region. While Japan has experienced low growth rates during the past decades, the current government under Prime Minister Abe has since 2013 embarked a path to stimulate economic growth, tackling deflation and lowering the country's high levels of public debt.¹³¹ IMF's projections however indicate that Japan's growth will continue to be modest in the coming years, near to or below 1 percent.¹³²

Trade is central for the region's economic growth and there are concerns about the US trade policies and the potential risks of escalating trade conflicts. The development of digitalisation and robotics presents many possibilities, but also pressures Asian economies to restructure the skill set of their labour forces. Both Japan and South Korea are already faced with aging populations. Meanwhile China, with the legacy from its one-child policy faces the risk of 'growing old before growing rich', implying a shrinking share of working age population, which will make it more difficult to achieve rapid economic growth.¹³³

2.4 The Middle East and North Africa

Saudi Arabia is the largest military spender in the Middle East and North Africa (MENA) region, only the US and China devote more resources to defence in a global comparison. In 2017, Saudi Arabia had the largest military spending as a share of GDP among major world powers, amounting to 10.3 percent, as shown in Table 4. It is worth noting that several countries in the region are not included in the sample due to lack of reliable data on military expenditure, among them the United Arab Emirates (UAE).

¹²⁸ World Bank (2018). *Manufacturing, value added (% of GDP)*. (Accessed 17 October 2018)

¹²⁹ DW (2017). "India to launch Goods and Services Tax (GST); its biggest ever fiscal reform", *DW*, 29 June 2017. (Accessed 17 October 2018).

¹³⁰ IMF (2018). *World Economic Outlook Database*, April 2018.

¹³¹ IMF (2018). "Asia Pacific", *Regional Economic Outlook*, April 2018, p. 59.

¹³² IMF (2018). *World Economic Outlook Database*, April 2018.

¹³³ IMF (2018). "Asia Pacific", *Regional Economic Outlook*, April 2018, pp. 16, 26.

In 2014, the UAE had the second highest military spending in the region at USD 23 billion.¹³⁴ SIPRI has not reported data on the country's military spending since then. However, if spending levels were roughly similar to 2014 it would remain the region's second largest spender. The UAE also participates in the Saudi-led military intervention in Yemen since 2015.

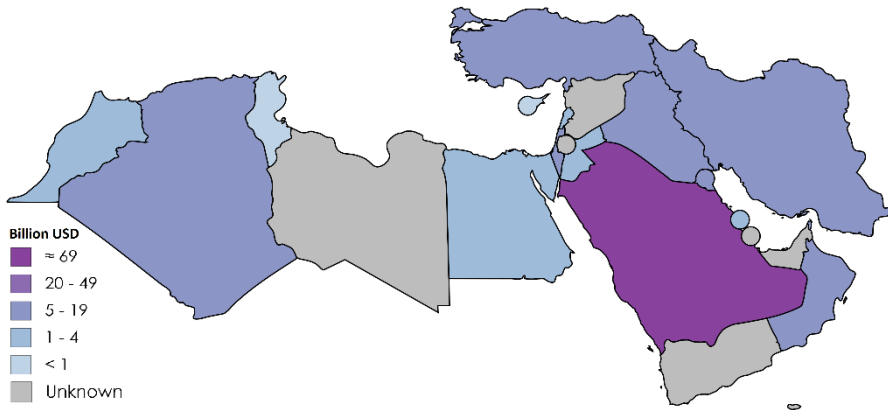


Figure 9: MENA Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

Among the countries with available data, Turkey is the second largest military spender in the region. The country has increased its spending steadily over the past decade and this trend is expected to continue in the foreseeable future as Turkey strives to meet NATO's 2 percent of GDP target.¹³⁵ Note that according to SIPRI data, Turkey already fulfils this condition while according to NATO estimates, defence spending in terms of GDP was 1.5 percent in 2017.¹³⁶

Meanwhile, Israel's military spending has stagnated in recent years, growing on average by only 0.3 percent during the past ten years and decreasing during the past three. An agreement was reached in 2016 with the US for a military aid package of USD 38 billion to Israel between 2019 and 2028. This is the largest single military aid package by the US in history. It replaces the 2007 agreement which provided USD 30 billion in military aid until 2018.¹³⁷ It is important to note that

¹³⁴ SIPRI (2018a). *Military Expenditure Database*.

¹³⁵ Defence Turkey (2018). "Considerable Increase in Turkey's 2018 Budget for Defense", *Defence Turkey*. (Accessed 2 August 2018).

¹³⁶ NATO (2018). *Defence Expenditure of NATO Countries (2011-2018)*. Press release, 10 July 2018.

¹³⁷ The White House (2016). "Memorandum of Understanding Reached with Israel", *The White House, Obama Administration*, 14 September 2016. (Accessed 2 August 2018).

military aid from the US is not counted by SIPRI as part of Israel's military spending, but rather as part of US military spending.¹³⁸ Despite modest levels of spending compared to Saudi Arabia, Israel has the most powerful military in the MENA region and the only country in the region currently believed to possess nuclear capabilities.¹³⁹

Table 4: Top 5 Military Spenders in the MENA, 2017. Source: SIPRI (2018).

Country	Billion USD (current prices)	Share of region (%)	Share of GDP (%)	Average growth 2008-17 (%)	Average growth 2015-17 (%)
Saudi Arabia	69	42.2	10.3	4.3	N/A
Turkey	18	11.1	2.2	4.4	12.8
Israel	16	10.0	4.7	0.6	-4.3
Iran	15	8.8	3.1	1.4	14.1
Algeria	10	6.1	5.7	9.7	-1.4

Iran's military spending has stagnated over the past ten years, having grown by 1.4 percent on average. However, military spending increased during the past three years and 2017 saw the highest increase during the past decade, 15 percent. The recovery in Iran's military spending could be due to an improved economic situation. The Iranian economy benefitted from the easing of economic sanctions following the signing of the nuclear deal.¹⁴⁰

Algeria is the only North African country among the top five spenders in the MENA region. The country's military spending has experienced rapid growth during the past ten years, growing by 10 percent on average. Military spending has however stagnated during the past three years which can be attributed to the budgetary effect of the slump in oil prices in 2014. Nonetheless, the country's armed forces are still the best equipped among North African countries.¹⁴¹

¹³⁸ SIPRI (2018). *SIPRI Definition of military expenditure*. (Accessed 2 August 2018)

¹³⁹ Hassan-Yari, Houchang (2016) "Middle East Warfighting Capabilities in 2025", in Holmquist, Erika & Rydqvist, John (eds.). *The Future of Regional Security in the Middle East: Expert Perspectives on Coming Developments*, FOI-R--4251--SE, April 2016, FOI: Stockholm, p.103.

¹⁴⁰ IMF (2018). "Islamic Republic of Iran", *Country Report*, No. 18/93, March 2018, p.4.

¹⁴¹ IISS (2018). "Chapter Seven: Middle East and North Africa" in *The Military Balance 2018*, p. 325.

Regional Security

Characterized by both rivalries between states and threats posed by non-state actors, the MENA remains the world's most volatile region. International coalition forces have been successful in dismantling ISIS and prevented it from establishing a *de facto* state across Iraq and Syria. The group however continues to pose a security threat and has also expanded into North Africa. The Syrian civil war which started in 2011 is currently in its seventh year. Russian and Iranian intervention has been key in changing the tide of the conflict in President al-Assad's favour which has enabled him to strengthen his grip on power. However, huge swathes of Syria's territory are still contested between the Syrian government and various state and non-state actors.¹⁴²

The Syrian war has several dimensions, one of the most important being the much wider Saudi-Iranian regional rivalry. Saudi Arabia and Iran have been locked in historical mutual mistrust and are currently conducting a number of wars by proxy. Israel also has an antagonistic relationship with Iran. It wants to prevent Iran from establishing permanent military bases or arms factories in Syria and the delivery of weapons systems to *Hezbollah* in Lebanon.¹⁴³ This is shown by Israel occasionally carrying out air strikes in Syria targeting Iran's installations or deliveries of weapons to *Hezbollah*.¹⁴⁴ Both Israel and Saudi Arabia fear an Iranian land corridor to Lebanon through Iraq and Syria. Israel is also committed to oppose Iranian forces in Syria from getting close to its border.

Saudi Arabia also contends that Iran is supporting Shia groups in its eastern province, in Bahrain and the Houthis in Yemen. Saudi Arabia has since 2015 spearheaded a military intervention in Yemen targeting the Houthis.¹⁴⁵ However, despite significant military spending and possession of the most advanced arms around the Persian Gulf, the intervention in Yemen has revealed weaknesses in Saudi Arabia's war fighting capabilities.¹⁴⁶ The Saudi-led intervention in Yemen has also led to a severe humanitarian crisis.¹⁴⁷ The Saudi-Iranian rivalry is likely

¹⁴² Bowen, Jeremy (2018). "Sense of an ending for Syria's war on Idlib front line", *BBC News*, 9 October 2018. (Accessed 1 November 2018).

¹⁴³ Bergenwall Samuel (2017). *Israeliska perspektiv på utvecklingen i Mellanöstern*, FOI Memo 6130, September 2017, FOI: Stockholm.

¹⁴⁴ Kershner, Isabel & Halbfinger, David M. (2018). "Israel and Iran, Newly Emboldened, Exchange Blows in Syria Face-Off", *The New York Times*, 10 May 2018. (Accessed 1 November 2018).

¹⁴⁵ Bergenwall Samuel (2016). *Saudiarabiens offensiva strategi i maktkampen med Iran*, FOI Memo 5703, May 2016, FOI: Stockholm.

¹⁴⁶ Hassan-Yari Houchang (2016), "Middle East Warfighting Capabilities in 2025" in Holmquist Erika & Rydqvist John (eds.). *The Future of Regional Security in the Middle East: Expert Perspectives on Coming Developments*, p. 105.

¹⁴⁷ DW (2018). "UN Geneva donor conference appeals for \$2.6 billion for Yemen", *DW*, 3 April 2018. (Accessed 31 August 2018).

to continue being the key determinant of the region's security given that the two countries are involved in most of the wars and conflicts in the region.¹⁴⁸

Israel and Saudi Arabia also opposed the nuclear deal between Iran and the P5+1 powers.¹⁴⁹ One of the stated reasons was that the deal gave Iran the possibility to acquire nuclear weapons at a later stage. Saudi Arabia also considers the easing of economic sanctions as giving Iran resources to continue destabilizing the region and also increase its influence.¹⁵⁰ The two countries therefore welcomed the US decision to withdraw from the nuclear deal. However, some analysts and policy makers fear that the US decision will push Iran to go forward with its nuclear ambitions. As the US re-imposes sanctions on Iran and threatens to halt the country's oil exports, Iran has threatened to disrupt oil exports from the region.¹⁵¹ If current hostilities worsen, there could be a possibility of a multilateral conflict around the Gulf and Strait of Hormuz, a vital route for global transports of oil and gas.

The US is also a key player in the MENA region's security context. The US has several allies in the region, notably Israel and Saudi Arabia. Both countries are central to US policy in the region, especially in containing Iran. Additionally, Bahrain harbours the US Navy's Fifth Fleet whereas Qatar hosts the largest US military base in the region.¹⁵² The direct US involvement in the region has wound down since the invasion of Iraq in 2003. However, the US military campaign has played a key role in dismantling ISIS in Syria and Iraq. Furthermore, the US support for Israel and Saudi Arabia against Iran will continue to be central for the security development in the region.

Defence Industry and Equipment

Saudi Arabia was the second largest importer of arms in the world after India, between 2013 and 2017.¹⁵³ Given that only about 2 percent of the armed forces' equipment is acquired domestically, the country is heavily reliant on foreign suppliers.¹⁵⁴ Saudi Arabia hopes to strengthen its domestic industry in the future and aims at allocating at least half of its defence budget to the national defence industry by 2030. The country has a stated ambition of becoming among the leading global

¹⁴⁸ Holmquist Erika & Rydqvist John (2016). *The Future of Regional Security in the Middle East: Expert Perspectives on Coming Developments*, p. 11.

¹⁴⁹ The P5+1 includes the five permanent UN Security Council members; the US, China, Russia, France and the UK, plus Germany.

¹⁵⁰ Bergenwall, Samuel (2016). *Saudiarabiens offensiva strategi i maktkampen med Iran*.

¹⁵¹ Kamali Deghan, Saeed (2018). "Iran threatens to block Strait of Hormuz over US oil sanctions", *The Guardian*, 5 July 2018. (Accessed 10 December 2018).

¹⁵² Knecht, Eric (2018). "As rift lingers with neighbors, Qatar ramps up air and seapower", *Reuters*, 29 November 2018. (Accessed 10 December 2018).

¹⁵³ Wezeman, Pieter et al. (2018). "Trends in International Arms Transfers 2017". *SIPRI Fact Sheet*.

¹⁵⁴ Bergenwall, Samuel (2016). *The Assertive Kingdom - Saudi Arabia's Threat Perception, Capabilities and Strategies*, FOI-R--4390--SE, December 2016, FOI: Stockholm, pp. 23, 29.

arms producers by 2030.¹⁵⁵ Whether or not this vision can be realised remains to be seen.

Israel has the most advanced defence industry in the region. The country was among the ten major arms exporters globally during the past five years, including significant exports to advanced economies such as Germany, the US and the UK.¹⁵⁶ Having an advanced domestic defence industry has also given the Israeli armed forces an advantage over other regional powers.¹⁵⁷ However, the recent military aid agreement with the US requires Israel to buy its equipment and services from the US when using the aid fund. In the previous agreement, 26 percent of aid funds could be used to purchase non-US military hardware and services.¹⁵⁸ Even if larger Israeli firms have subsidiaries in the US and could bypass this restriction, there are fears that the new condition may have a negative impact on the Israeli defence industry, especially smaller firms.¹⁵⁹

Turkey also has one of the most advanced arms industries in the region, although it is heavily reliant on foreign components and technology. The arms industry currently meets up to half of the Turkish Armed Forces' needs.¹⁶⁰ However, Turkey aims at becoming completely self-sufficient by 2023. One of the reasons for this ambition is difficulties in acquiring certain components from Western suppliers. Germany and the US have for instance been accused by the Turkish leadership of stopping or delaying the delivery of spare parts to Turkey.¹⁶¹ The heavily depreciated Turkish currency makes arms imports more expensive, fuelling ambitions for further self-reliance.¹⁶² Turkey's decision to procure the S-400 air defence system from Russia has increased tensions with its NATO allies, even prompting calls from some US lawmakers to cancel the delivery of F-35s to the country.¹⁶³

Iran has been subjected to UN embargos, affecting its arms trade. Despite the nuclear deal, an embargo on arms exports remains in place until at least 2020 and

¹⁵⁵ Ibid.

¹⁵⁶ SIPRI (2018). *Arms Transfers Database*.

¹⁵⁷ Hassan-Yari Houchang (2016), "Middle East Warfighting Capabilities in 2025" in Holmquist Erika & Rydqvist John (eds.). *The Future of Regional Security in the Middle East: Expert Perspectives on Coming Developments*, p.103.

¹⁵⁸ The White House (2016). "Memorandum of Understanding Reached with Israel".

¹⁵⁹ Scheer, Steven (2016). "Israel defense sector faces big hit after new U.S. aid agreement", *Reuters*, 20 September 2016. (Accessed 2 August 2018)

¹⁶⁰ Hogg, Jonny & Sezer, Can (2017). "Erdogan aims to turn Turkey into major defense industry power", *Reuters*, 27 May 2017. (Accessed 10 August 2018).

¹⁶¹ Bekdil, Burak Ege (2017). "Turkey accuses US, Germany of arms embargo", *Defense News*, 25 September 2017. (Accessed 10 August 2018).

¹⁶² McGerty, Fenella (2018). "Turkey's Defence Budget – the fallout from high inflation and a weak lira", *IHS Markit*, 10 April 2018. (Accessed 10 August 2018).

¹⁶³ Browne, Ryan (2018). "Senate attempts new maneuver to block Turkey from getting stealth jet", *CNN*, 21 June 2018. (Accessed 7 August 2018).

arms imports are still subject to approval by the UN Security Council.¹⁶⁴ The restriction on arms imports means that the country mainly depends on the domestic defence industry to meet its needs. Iran's defence industry is quite advanced by regional standards, but without the ability to import and access foreign technology it has so far been unable to supply modern weapons systems.¹⁶⁵ Almost all arms deliveries to Iran since 2005 have been from China and Russia.¹⁶⁶ In 2016, Iran received four S-300 air defence batteries from Russia, the first major arms imports since 2007.¹⁶⁷

Macroeconomic Trends

Many oil exporters in the region were affected by the 2014 fall in oil prices. For instance, the public debt of Saudi Arabia increased from 1.6 percent of GDP in 2014 to 17 percent in 2018 and is projected to grow to 29 percent in 2023.¹⁶⁸ Iran's public debt faced a similar development although in this case it could somewhat paradoxically have been a result of the easing of international economic sanctions. This enabled Iran to borrow from international capital markets in a bid to invest in key sectors of its economy.

Even if the public debts of oil and gas exporters are manageable, rapid accumulation should be a concern according to the IMF. Public debt among this group of countries is projected to continue to grow. This is due to slow fiscal consolidation, weak projected economic growth and potentially higher interest payments on debt caused by expected monetary tightening in advanced economies.¹⁶⁹ The recent recovering oil price is positive for the region. However, given that many countries' budgets were benchmarked on oil prices of at least USD 100 per barrel, continued price recovery is important for oil exporters.¹⁷⁰ There are however mixed signals to future oil and gas prices as varying factors could push them in either direction.

Turkey has seen steady economic growth in recent years, averaging 6.8 percent between 2010 and 2017.¹⁷¹ However, economic stability is currently threatened by high inflation, high public debt, a large current account deficit and a depreciating

¹⁶⁴ SIPRI (2016). *UN arms embargo on Iran*, 20 January 2016. (Accessed 2 August 2018).

¹⁶⁵ IISS (2017). "Chapter Seven: Middle East and North Africa", in *The Military Balance 2017*, p. 376.

¹⁶⁶ SIPRI (2018b). *Arms Transfers Database*.

¹⁶⁷ Blanchfield, Kate; Wezeman, Pieter & Wezeman, Siemon (2017). "The state of major arms transfers in 8 graphics", *SIPRI Commentary*, 22 February 2017. (Accessed 2 August 2018).

¹⁶⁸ IMF (2018). *World Economic Outlook Database*.

¹⁶⁹ IMF (2018). "Middle East- North Africa, Afghanistan, and Pakistan", *Regional Economic Outlook*, May 2018, p. 6.

¹⁷⁰ Sullivan, Paul (2016). "Energy, Politics, and Security in the Middle East and North Africa", in Holmquist, Erika & Rydqvist, John (eds.). *The Future of Regional Security in the Middle East: Expert Perspectives on Coming Developments*, p.72.

¹⁷¹ IMF (2018). *World Economic Outlook Database*.

currency. A depreciated Turkish *lira* makes imports and debt held in foreign currencies more expensive. Raising interest rates could be an option to ease some of the country's ongoing economic problems. However, President Recep Tayyip Erdoğan has so far been opposed to this suggestion.¹⁷²

Iran's economy has been on a path of recovery following the nuclear deal. However, the decision by the US to withdraw from the deal and re-impose sanctions is expected to impact the Iranian economy negatively. So far other signatories have shown continued commitment to the deal and have not re-imposed sanctions. The EU has also introduced legislation expected to offer some protection to European firms doing business with Iran.¹⁷³ Nonetheless, many countries and businesses are likely to succumb to American pressure on sanctions which will impact the Iranian economy. Slower growth will likely delay major increases in military spending and modernisation as priority will be given to appeasing the population which has started to show displeasure with the state of the economy.¹⁷⁴

Generally, the region's economic growth is expected to be affected by cautious public spending and intensifications in geopolitical conflict. Even if the 2014 fall in oil prices forced key military spenders into austerity policies, military spending is protected in most cases due to internal and external security concerns. Therefore, military expenditure is likely to keep increasing in the near future.¹⁷⁵

2.5 Sub-Saharan Africa

Military spending in sub-Saharan Africa is relatively low compared to other regions. No single country's military spending exceeds USD 5 billion and there is no dominant actor in terms of spending. However, Sudan, South Africa and Angola together accounted for over half of the region's total spending in 2017, as shown in Table 5.¹⁷⁶

Sudan devoted most resources on military spending in the sub-Saharan Africa region in 2017. This despite its GDP being only one sixth the size of Nigeria's and South Africa's, the largest economies in the region. Angola's military spending has declined significantly in recent years, mostly due to the collapse of oil prices from mid-2014, which had an adverse effect on state revenues. Income from the

¹⁷² Courcoulas, Constantine; Ant, Onur & Ozsoy, Tugce (2018). "Why Can't Turkey Stop Its Economic Nose-Dive?", *Bloomberg*, 8 August 2018. (Accessed 14 August 2018).

¹⁷³ EEAS (2018), "Joint statement on the re-imposition of US sanctions due to its withdrawal from the Joint Comprehensive Plan of Action (JCPOA)", *Joint Statement*, 6 August 2018. (Accessed 10 August 2018).

¹⁷⁴ BBC News (2018), "Iran economic protests shut Tehran's Grand Bazaar", *BBC News*, 25 June 2018. (Accessed 22 August 2018).

¹⁷⁵ Jane's 360 (2017). "Global Defence Spending to Hit Post-Cold War High in 2018", *Jane's Press Release*, 18 December 2017. (Accessed 6 August 2018).

¹⁷⁶ SIPRI (2018a). *Military Expenditure Database*.

oil and gas sector in Angola accounts for 52 percent of state revenues and 30 percent of GDP, making the country highly sensitive to oil price fluctuations.¹⁷⁷

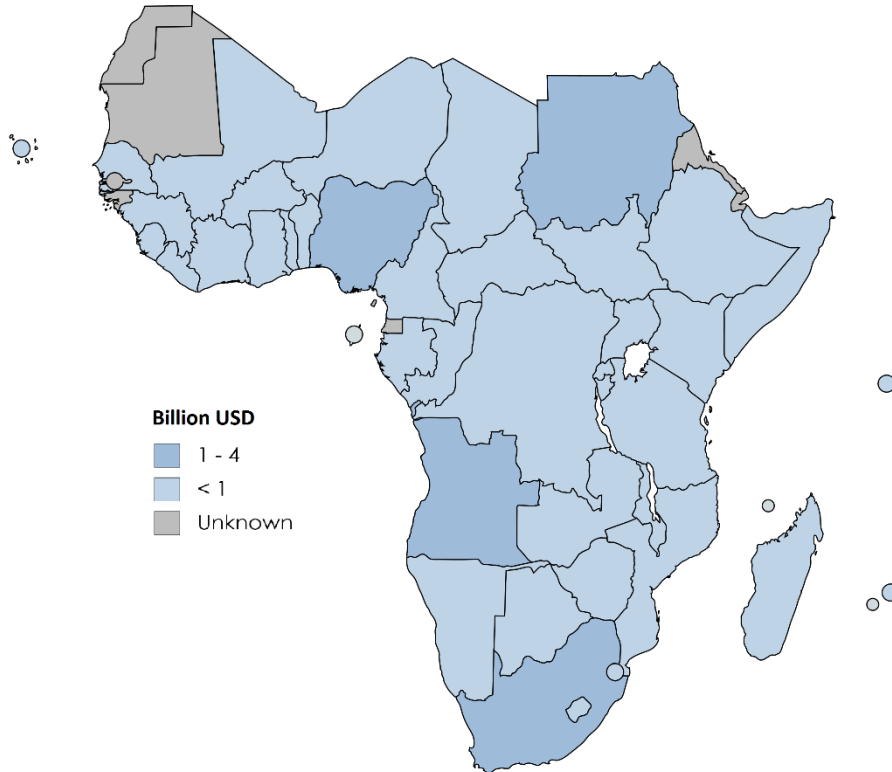


Figure 10: Sub-Saharan Military Expenditure, 2017 (current prices). Source: SIPRI (2018a)

Sudan has managed to sustain high military spending despite economic woes. The country lost 75 percent of its oil reserves and 60 percent of oil revenues when South Sudan seceded in 2011.¹⁷⁸ Sudan's priority of military spending can be related to multiple security challenges such as insurgencies in the Darfur, South Kordofan, and the Blue Nile regions.¹⁷⁹

¹⁷⁷ Muzima, Joel (2018). *2018 African Economic Outlook - Angola*, African Development Bank, p. 2.

¹⁷⁸ IMF (2013). "Sudan – Selected Issues", *Country Report*, No. 13/320, October 2013. p.21.

¹⁷⁹ BBC News (2018). "Why the end of US sanctions hasn't helped Sudan", *BBC News*, 11 July 2018. (Accessed 22 August 2018).

For Nigeria, income from the oil and gas sector accounts for 75 percent of state revenues.¹⁸⁰ Unlike Sudan, the country has not maintained military spending levels, which has declined consistently since 2012. This in spite of an ongoing military action against *Boko Haram* in the north east and instability in the oil rich Niger delta region.

Table 5: Top 5 Military Spenders in sub-Saharan Africa, 2017. Source: SIPRI (2018).

Country	Billion USD (current prices)	Share of region (%)	Share of GDP (%)	Average growth 2008-17 (%)	Average growth 2015-17 (%)
Sudan	4.4	20.4	3.2	-	20.1
South Africa	3.6	16.9	1.0	1.0	-1.6
Angola	3.1	14.3	2.2	-3.6	-18.4
Nigeria	1.6	7.6	0.4	-0.1	-3.8
Kenya	1.0	4.5	1.2	2.9	2.5

Regional Security

In the Sahel region, Islamist groups have benefited from regional instability to establish themselves as the main trans-regional threat. The collapse of the Libyan state in 2011 resulted in the proliferation of weapons and movement of fighters southwards which strengthened insurgent groups. In addition to an increase in terrorist attacks, the region is also characterized by high poverty rates, vulnerability to climate change as well as shortages of human and physical capital. Except loss of human life, these factors have resulted in more than 5 million people becoming refugees or internally displaced and 30 million being exposed to food insecurity.¹⁸¹

A more positive development is the thaw between Ethiopia and Eritrea. The two countries agreed to mend relations after one of the longest inter-state rivalries in the history of sub-Saharan Africa. This rapprochement has taken place after the appointment of Abiy Ahmed as Prime Minister of Ethiopia in April 2018. The improvement in ties between the two states could have major consequences, such as an end to universal and indefinite conscription in Eritrea. Conscription has been

¹⁸⁰ IMF (2017). "Nigeria – Selected Issues", *Country Report*, No. 17/81, April 2017. p. 6.

¹⁸¹ IMF (2018). "Sub-Saharan Africa", *Regional Outlook*, April 2018, pp.17-18.

one of the main causes of mass exodus of Eritrea's citizens.¹⁸² Since the two countries have been engaged in a war by proxies in Somalia, a settlement could contribute to the stability of the security situation in that country as well.¹⁸³

A number of East African states including Burundi, Ethiopia, Djibouti, Kenya and Uganda have since 2007 sent troops to Somalia as part of an African Union led mission to mitigate the threat posed by *Al-Shabaab*.¹⁸⁴ There has been some progress, especially around the Somali capital Mogadishu, although the terrorist group has continued to carry out attacks which often result in huge casualties.

Internal conflicts in Burundi, the Democratic Republic of Congo and South Sudan have resulted in historically high number of refugees and internally displaced people. The civil war in South Sudan alone is believed to have displaced over 3.4 million people, making it Africa's largest refugee crisis and third largest in the world.¹⁸⁵ However, there is renewed hope for peace given that the power sharing agreement between President Salva Kiir and Vice President Riek Machar holds. Although previous agreements have often collapsed.¹⁸⁶

In recent years the strategically important country Djibouti has gained international attention as major powers such as China, Japan, France and the US, all have established military bases in the small Horn of Africa nation.

Defence Industry and Equipment

Overall the armed forces of sub-Saharan Africa are heavy reliant on arms imports due to the lack of domestic defence industrial capabilities. South Africa is the main exporter of arms in the region, while Nigeria has been the main importer during the period 2013 to 2017. Nigeria together with Sudan, Angola, Cameroon and Ethiopia accounted for 56 percent of arms imports in the region. China has been the region's main arms supplier during this period. Due to limited resources, regional arms imports generally have low technology content.¹⁸⁷

South Africa's domestic defence industry is the largest and most advanced in the region. It was established as a response to a UN arms embargo on the apartheid government. In recent years, the country's defence industry has relied on export

¹⁸² BBC News (2018). "Ethiopia's Abiy and Eritrea's Afwerki declare end of war", *BBC News*, 9 July 2018. (Accessed 7 August 2018).

¹⁸³ Tejpar, Johan & Gasinska, Karolina (2012). *Säkerhetsutvecklingen i Afrika söder om Sahara i ett 10-årsperspektiv*, FOI-R--3537--SE, December 2012, FOI: Stockholm, p.11.

¹⁸⁴ African Union Mission in Somalia (2018). *AMISOM*. (Accessed 10 December 2018).

¹⁸⁵ Cook, Nicolas; Arieff, Alexis; Blanchard, Lauren Ploch; William, Brock R.; Husted, Thomas F. (2017). *Sub-Saharan Africa: Key Issues, Challenges, and U.S. Responses*. Congressional Research Service, March 2017, p.14.

¹⁸⁶ Maasho, Aaron (2018). "South Sudan's president, rebel leader sign peace deal", *Reuters*, 12 September 2018. (Accessed 10 December 2018).

¹⁸⁷ Wezeman, Pieter et al. (2018). *Trends in International Arms Transfers 2017*.

markets due to cuts in domestic military spending.¹⁸⁸ Major exports in recent years consist of armoured vehicles and missiles. The UAE has been the main recipient, accounting for 22 percent of South Africa's arms exports during the last five years.¹⁸⁹ The South African government presented a defence industry strategy in 2017 including goals to reduce the reliance on arms imports and further promoting exports.¹⁹⁰

Sudan has been subject to an arms embargo by the EU since 1994, preventing Sudanese arms imports from the bloc.¹⁹¹ It has also been subject to a UN arms embargo since 2005 restricting arms deliveries that could be used in the conflict in Darfur.¹⁹² These restrictions help explain why 88 percent of Sudan's arms imports during the last five years have been delivered by China, Russia and Belarus.¹⁹³

Macroeconomic Trends

In 2017, the economic growth of sub-Saharan Africa recovered after having been in decline since 2014. The IMF projects regional growth to continue an upward trend between 2018 and 2023, averaging 4.3 percent.¹⁹⁴

This recovery has mainly been supported by stronger global growth and higher commodity prices which has been beneficial to economies relying on the export of raw materials. Despite promising growth prospects, rapid rising public debt is seen as a concern, having risen above 50 percent since 2015. Of the low-income countries in the region, 40 percent are considered to be in debt distress or at high risk of debt distress. Factors that have contributed to the increasing debt include large budget deficits, interest payments on existing debt, negative economic growth in some economies, and currency depreciations which have made funds borrowed in foreign currencies more expensive.¹⁹⁵

Trade integration in the subcontinent is currently low. In 2016, only 17 percent of total imports and 30 percent of total exports were within the region.¹⁹⁶ Negotiation of the African Continental Free Trade Area (AfCFTA) has been ongoing since 2015 under the auspice of the African Union. The goal is to boost intra-Africa trade by eliminating 90 percent of tariffs on goods. The hope is that this will stimulate economic growth by boosting intra-Africa trade by as much as 52.3 percent

¹⁸⁸ IISS (2017). "Chapter 6: Sub-Saharan Africa" in *The Military Balance*, p.485.

¹⁸⁹ SIPRI (2018). *Arms Transfers Database*.

¹⁹⁰ South Africa National Defence Industry Council (2017). *Defence Industry Strategy*, May 2017, p.121.

¹⁹¹ SIPRI (2012). *EU arms embargo on Sudan*, 23 November 2012. (Accessed 17 August 2018).

¹⁹² SIPRI (2012). *UN arms embargo on Sudan (Darfur region)*, 25 October 2012. (Accessed 17 August 2018)

¹⁹³ SIPRI (2018b). *Arms Transfers Database*.

¹⁹⁴ IMF (2018). *World Economic Outlook Database*.

¹⁹⁵ IMF (2018). "Sub-Saharan Africa", *Regional Economic Outlook*, April 2018, pp.1-3, 10 - 11

¹⁹⁶ World Bank (2018). *World Integrated Trade Solution (WITS)*. (Accessed 2018).

in 2022 compared to 2010.¹⁹⁷ However, AfCFTA is likely to face several challenges, including the fact that all 55 countries has to be signatories. Furthermore, countries that already have an established industrial base are likely to be the main beneficiaries of such a deal.¹⁹⁸

Sudan's economy has grown by 3 percent on average during the past five years and projections indicate continued stable growth. In the long run, Sudan's economy is expected to benefit from the US decision in 2017 to suspend economic sanctions, which have been in place since 1997. A resumption of South Sudanese oil production would also be beneficial to Sudan's economy, as pipeline fees give the northern neighbour USD 25 per barrel.¹⁹⁹ However, whereas military spending has been given priority, the government has been imposing austerity elsewhere such as stopping subsidies of some necessities. This has contributed to high inflation which has resulted in sporadic protests due to the high costs, for instance of bread.²⁰⁰ Sudan's public debt, in 2017 standing at 126 percent of GDP, is the highest in the region and risks causing a drag of the economy.²⁰¹

South Africa, the region's second largest and most industrialised economy, has experienced weak real economic growth in recent years due to a fall in prices of coal, platinum, iron ore and gold, the country's key exports. Other factors which have contributed to a slow economic growth include drought, and weak demand for domestic industrial output. Corruption scandals under President Jacob Zuma also affected the economy, damaging investor confidence and weakening the currency.²⁰² President Cyril Ramaphosa replaced Zuma in February 2018 and has since embarked on reviving South Africa's economy by for instance attracting international capital.²⁰³

Angola is, as previously mentioned, an oil dependent economy which has been severely affected by the falling oil prices in 2014. However, IMF projections indicate that economic growth will recover, growing by 3.7 percent on average between 2018 and 2023. Although for sustainable growth, the economy needs to di-

¹⁹⁷ Signé, Landry (2018). "Africa's big new free trade agreement, explained", *The Washington Post*, 29 March 2018. (Accessed 23 August 2018).

¹⁹⁸ Witschge Loes (2018). "African Continental Free Trade Area: What you need to know", *Al-Jazeera*, 20 March 2018. (Accessed 27 August 2018).

¹⁹⁹ BBC News (2018). "Why the end of US sanctions hasn't helped Sudan", *BBC News*, 11 July 2018. (Accessed 30 August 2018).

²⁰⁰ Omer, Rabah (2018), "What is behind the economic crisis in Sudan?", *Africa is a Country*, 12 March 2018. (Accessed 30 August 2018).

²⁰¹ IMF (2018). *World Economic Outlook Database*.

²⁰² Mbatha, Amogelang (2017). "The President Who Caused a Recession", *Bloomberg*, 20 June 2017. (Accessed 27 August 2018).

²⁰³ Russel, Alec; Barber Lionel & Pilling David (2018). "Cyril Ramaphosa outlines blueprint to revive South Africa economy", *Financial Times*, 19 April 2018. (Accessed 23 August 2018).

versify in order to mitigate the effect of shocks in the energy sector on the economy. The potential for economic diversification mainly lies in the extraction of other minerals, investment in agriculture and increasing industrial output.²⁰⁴

Nigeria, sub-Saharan Africa's largest economy, is projected to experience positive growth in the coming years due to rising oil prices and the increased oil output which will likely follow. Nigeria's projected growth is however lower than growth rates prior to the oil price fall in 2014.²⁰⁵

Of the top five regional military spenders, Kenya has recorded the most sustainable growth owing to a diversified economy.²⁰⁶ Growth during the last 5 years has been strong, averaging 5.5 percent. Projections point at even stronger growth in the future, at 6.1 percent between 2018 and 2023.²⁰⁷

Even though there has recently been positive signs for the economies of sub-Saharan Africa, many countries are still dependent on commodity exports. These are in turn dependent on the overall world economy, which may face some headwinds in a not too distant future.

2.6 Future Trends and Developments

Even though the US and the rest of NATO's share of global military spending has decreased during the last decade, these nations still account for more than half of the world's total military spending. However, while countries such as China and Russia are nowhere near to supplant the US as the preeminent global military power, their increased spending and military modernisation have already had an impact on the power balance in their respective regions. Furthermore, the pace of change has been rapid. While China's military spending still only accounts for one third of the US level, its global share has more than doubled and absolute spending has increased by 164 percent over the past ten years.

The same broad trend can also be seen in terms of military equipment. The armed forces of the US still have a major advantage in terms of modern equipment, reflecting decades of high spending levels. France, the UK and Germany also have quite technologically advanced materiel, but quantities have decreased as equipment has become more modern. Meanwhile, China's increased spending has enabled the rapid modernisation of the PLA, especially its navy with more and an

²⁰⁴ Muzima, Joel (2018). "2018 African Economic Outlook – Angola", *African Development Bank*, pp. 2-3.

²⁰⁵ IMF (2018). *World Economic Outlook Database*.

²⁰⁶ Alemu, Zerihun (2018). *African Economic Outlook, Kenya*, AfDB, pp.2-3

²⁰⁷ IMF (2018). *World Economic Outlook Database*.

increasingly modern surface combatants. Russia seems to have relied more on upgrading older equipment rather than introducing new materiel. Details on trends in military equipment quantities can be seen in Appendix B.

In macroeconomic terms, a shift in global power is already underway. China passed Japan to become the world's second largest economy back in 2010. In terms of purchasing power, the Chinese economy surpassed the US in 2014.²⁰⁸ However, in terms of nominal GDP the US still remains the world's largest economy. But how long will this remain true?

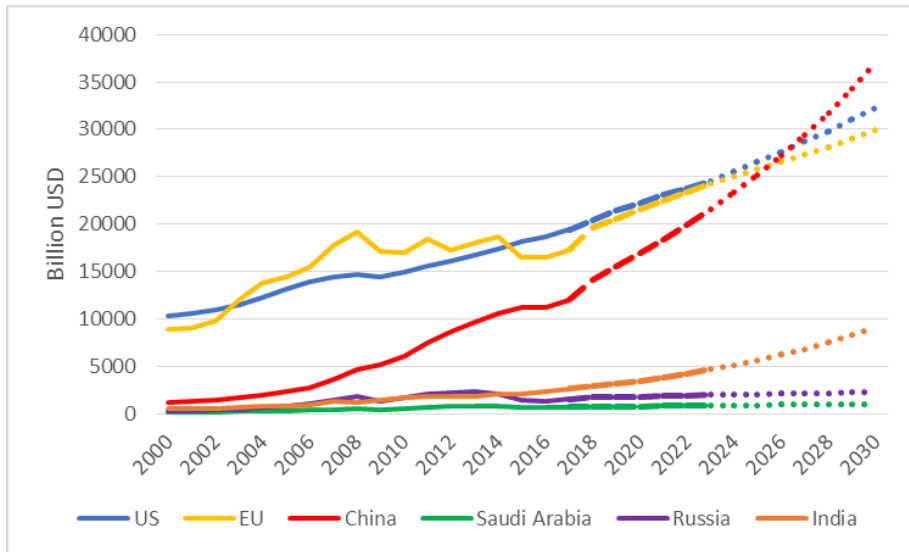


Figure 11: GDP in USD for Major Powers, Figures and Prolonged Trends, 2000-2030 (current prices). Source: IMF (2018)

Making predictions about the future is fraught with uncertainties. Current IMF forecasts for future global GDP stretch to 2023 and the results paint a familiar picture, see the dashed line in Figure 11. According to IMF predictions, the US will retain its number one position in 2023 even though China will continue to close in on both the US and the EU. It is worth noting that even though India will experience faster growth rates than China, the absolute gap between the two Asian economic giants will increase. This is a consequence of China's economy being four and a half times larger than that of India.²⁰⁹

The oil and gas dependent economies of Russia and Saudi Arabia will experience some modest levels of recovery, but their global economic power largely depends

²⁰⁸ Ibid.

²⁰⁹ Ibid.

on the stability and predictability of oil and gas prices. They will need to intensify the diversification of their economies in order to limit the impact of price shocks and find additional sources of revenue.

Trying to look beyond 2023 becomes even more difficult. While it is not in the scope of this report to make any predictions, a point can be illustrated by prolonging the current trends in economic development, see the dotted line in Figure 11. Assuming that the trends observed and projected during the decade leading up to 2023 will continue until 2030, then China's economy will overtake the US somewhere around 2027. Again, note that these prolongations are expressed in current prices and therefore do not take into account any impact of inflation or currency fluctuations.

These prolongations present results similar to the IMF's own projections that China's economy will overtake the US in nominal terms by 2030.²¹⁰ However, as noted above, Chinese growth has been slowing in recent years and is likely to continue slowing. These results should not be taken at face value. Nonetheless, they can help to give some indications about the future economic power balance between China and the US. It is once again worth noting that even if India was to continue experiencing higher growth rates than China over the next decade, the absolute gap will continue to widen. The distance between China and India to Russia and Saudi Arabia will also continue to increase.

The consequences for military spending can only be speculated upon. But assuming that both the US and China continue to allocate the same share of GDP towards military expenditure as in 2018, the US would still spend one and a half times more on its military than China around 2030. This would mean, given the hypothetical prolongation above, that even if China was to catch up to the US economically, there would still be some way to go before it could match the US in terms of military expenditure.

²¹⁰ IMF, *China's Economic Outlook in Six Charts*, 26 July 2018. (Accessed 1 November 2018).

3 The European Defence Industry

The European defence industry²¹¹ consists of a few large prime contractors, several second tier producers and of about 2,500 small and medium enterprises (SMEs). The large defence companies include for instance BAE Systems, Airbus, Leonardo, Thales and Rolls Royce.²¹² European defence related SMEs are mainly concentrated to France, Germany, Italy, Spain, Sweden and the UK, roughly the same countries as the larger firms.²¹³ The industry employs about half a million people directly and about 1.2 million indirectly.²¹⁴

The governance and ownership structure of European defence companies vary significantly. While most have both civil and military branches a few have defence as their exclusive business. Furthermore, some companies are state-owned, while others are private or a mixture of privately and state owned. Most companies are national while some are trans-European.²¹⁵ Note that the definition of what constitutes a European company is not unproblematic. For instance, most of the larger European defence firms have a significant international presence. Moreover, while not included in this report, US defence companies have a large presence in Europe.

Due to the deteriorated security environment and the goals set out at the Wales Summit, the European defence industry will likely face an increased demand for their products. These new developments offer opportunities for the European defence industry. However, there are also challenges. The European defence industry needs to meet an increased demand after decades of reduced defence budgets. Moreover, rising unit costs have further pushed down production volumes. Another challenge is the historically fragmented nature of the European defence industry. All these factors contribute to reduce economies of scale and limit the ability to pool resources, for instance regarding research and development.

3.1 Towards Increased Cooperation?

For historical reasons the European defence market is largely national, where each country's industry to a certain extent rely on their domestic national markets. This has resulted in a relatively fragmented market. For instance, European countries have far more versions of military systems than the US, which spends far more.

²¹¹ In this report the European defence industry is defined as the arms industry with headquarters in European countries, not including Russia. The main focus of this report has been Western European companies.

²¹² Roth, Alexander (2017), "The size and location of Europe's defence industry", *Bruegel* (Accessed 19 November).

²¹³ European Commission (2018), *Defence Industries*. (Accessed 20 November 2018).

²¹⁴ Figure is an estimate from 2014, see *Ibid*.

²¹⁵ Referring to companies with headquarters in more than one European country, such as Airbus and MBDA.

The US operates 1 type of main battle tank while the 27 EDA member countries operate 17 types. The US operates 6 types of fighter aircraft compared to 20 for EDA members.²¹⁶ Note that comparing Europe with the US is not completely appropriate, since the comparison will be between one large country and 27 sovereign nations. Nonetheless, the large variation of equipment divided over comparatively small defence budgets limits economies of scale and the ability to pool resources, which affects the overall competitiveness of the European defence industry.

The debate on cooperation and consolidation of the European industry has been ongoing for decades. As described in the previous chapter, cooperation efforts within the EU Common Security and Defence Policy (CSDP) has gained momentum in recent years as a number of collaborative channels have opened up. These include the European Defence Fund (EDF) and the Permanent Structured Cooperation (PESCO), both introduced in 2018. The EDF provides funding for common European research and development projects while PESCO aims to promote cooperation and investment in defence as well as encouraging cooperation in developing capabilities.²¹⁷

There was a wave of mergers in the 1990s. While most of these resulted in national monopolies or oligopolies, some included the creation of prominent trans-European defence companies such as Airbus and MBDA.²¹⁸ There has also been consolidation in recent years. The common ownership agreed between German KWM and French Nexter will likely have consequences for the future development of armoured vehicles in Europe. The advertised cooperation between France and Germany on the joint development of a Future Combat Air System is another example of cooperation between the two large countries. On the other hand, the UK does not take part in this, as opposed to being part in the Eurofighter project. It is difficult to draw any conclusions on trends based on a few examples. However, there are some indications that European procurement has become less national and more European during the past decade.²¹⁹

Nonetheless, European countries are still highly protective of their industries and major defence projects. Besides the obvious issue of national security, these protective attitudes are linked to the issues of technological and logistical security of supply as well as industrial policies.

²¹⁶ Munich Security Conference (2017). *More European, More Connected and More Capable – Building the European Armed Forces of the Future*. Munich Security Conference & McKinsey, 29 November 2017.

²¹⁷ EEAS (2018). "Permanent Structured Cooperation", *EU Factsheet*. (Accessed 14 December 2018).

²¹⁸ Kluth, Michael (2017). "European defence industry consolidation and domestic procurement bias", *Defense & Security Analysis*, 33:2, pp. 158-173.

²¹⁹ Ibid.

3.2 Response to an Increased Demand

In order to gain answers to the European defence industry's response to an increased demand for military equipment interviews were conducted which included seven different companies or divisions from four different countries. The interviewees were senior executives or advisors at companies with headquarters in France, the UK, Germany and Sweden covering military equipment such as armoured vehicles, aircraft and munitions. In order to broaden the perspective to the entire supply chain, a workshop was conducted with stakeholders from the Swedish combat aircraft supply chain. The workshop was attended by the representatives from the Swedish Armed Forces, the Swedish Procurement agency (FMV), and from the Swedish Defence Research Agency (FOI).

First, the interviewees were asked to give their view on the current security environment. Second, they were asked whether or not they actually see an increased demand for their products and to describe their view on global competition. Third, they were asked to identify challenges and responses to an increased demand. Fourth, the interviewees were asked whether their production capacity could manage an increased demand. Fifth, the interviewees were asked to assess their situation with regards to research and development. Finally, they were asked about the situation of their sub-contractors.

The Security Environment

All companies interviewed identify that the global security environment has been deteriorating for some time and that military expenditure is increasing, which corresponds with the picture described in chapter 2 of this report. For some companies, the increased demand was considered a result of cyclical factors, i.e. the need to replace ageing equipment, while others saw an increase because of the demand for larger equipment volumes. The need to replace equipment arises either when it reaches its technical end of life or when it becomes obsolete or less appropriate in terms of operational value. The latter is determined by security needs as well as the technology requirements to be competitive in an international market.

Demand and Competition

The views on European demand were somewhat mixed. Even though several countries have increased their spending and others have signalled increases, for most companies these have yet to translate into increased demand for military equipment. Moreover, it was pointed out that increased military expenditure will not automatically translate into increased volumes of equipment. There is also a possibility that the quantity of equipment will continue to decrease, as they improve in quality and become increasingly expensive. This would not necessarily affect the industry's balance sheets, but it could have an impact on the military capabilities of countries.

While growth in demand from Europe was considered modest, growth from export markets has been more substantial. Despite this, domestic markets were still regarded as more important for the companies in terms of absolute revenue. Looking ahead, some of the interviewed companies are adapting to a future increase in demand from the European market while others remain more cautious. Previous experience has taught European defence companies that demand can be volatile.

There has always been competition, mainly from the well-established defence industries of the US and Russia, but currently there are also new players such as China, South Korea, Israel and Turkey. Other countries such as India and Saudi Arabia are also developing their own industries. At the same time competitors are often partners. For instance, European and US companies often share a great deal of technology. When it comes to less advanced export partners, some technology transfers are usually required. Building partner capabilities is key for exports, but also entails risks for creating new competitors. This is a balancing act, where long term relationships play a vital role.

The interviewed companies argued that the important defence industrial relationship with the US has been complicated by an increased protectionism in later years. They worry that the International Traffic in Arms Regulations (ITAR) will be used for this purpose. ITAR contains rules for export and re-export of US military equipment or components. The rules enable the US to stop the use and sale of any product with US content. The purpose of ITAR is to protect US technologies important to the country's security interests. The problem with ITAR from the interviewed companies' point of view is the lack of transparency concerning the rules of the game.

Challenges and Responses

While increasing demand was generally seen as an opportunity by the companies, for instance in order to reach economies of scale and gain resources for future investment, some challenges to meet a growing demand were identified. While a large and sudden increase would create problems for the industry, such a scenario was considered highly unlikely. More moderate and sustained volumes were considered manageable, but knowing what to plan for is crucial. Companies can handle stable increases over time, but do not want to risk creating overcapacity by adapting to an unsustainable increase.

The interviewed companies all identified access to skilled labour as either the main or a major challenge ahead. This mainly concerns specialised engineers where the industry competes with the IT and the finance sectors. In these sectors, the output is generally developed faster than in the defence industry where the lead time can be ten years or more. This is important as fast results may be considered attractive to newly graduated engineers. Additionally the salaries within the IT or finance sectors are very hard for defence companies to compete with. Rapid technological development creates a need for new types of experts for instance within cyber,

artificial intelligence, big data, advanced materials, hypersonic technology and unmanned vehicles.

One company mentioned a lack of skilled manufacturing personnel, such as welders. These are often locally recruited and therefore there is a dependence on the municipal level investment in vocational training. Companies that have an adjacent civil division can mitigate such a problem by shifting personnel towards the military division in case of an increased demand, but this does not apply for companies with defence as their only business. Another personnel related challenge is the time it takes to develop the specific skills required. For a certified technician the training is two years and for some engineers it could take up to 15 years depending on the assigned position. On the other hand, the companies had relatively good retention rates in general. Several companies had their own trainee and vocational programmes, while others coordinate education efforts with universities, colleges and high schools.

Some challenges with regards to recruiting personnel were country specific. In Germany, for instance, the defence industry still faces a challenge in regards to negative public perception, which is an obstacle when trying to attract labour. This is particularly difficult in regions where there are low levels of unemployment.

Financing and infrastructure were generally not considered a problem. The companies have sufficient financial resources either from their own revenue or through a parent company. Physical infrastructure would not limit the ability to meet a gradually growing demand. However, infrastructure could be a problem in case of a volatile demand, for instance if factories need to be maintained operational despite low production volumes. This would entail large costs. However, shutting them down and starting up again could mean an even larger cost. The consequence of this could be that companies would be unwilling to invest in large infrastructure projects if they believed that the increases were temporary.

The defence industry is characterised by long lead times. The length of these lead times varies with the types of equipment. Development of new technology can take a long time. While adaptation of an existing design could take a few years, the development of more advanced systems could take one to several decades.

Production Capacity

In regard to production capacity, the companies did not see it as likely that demand will increase so much that production capacity would become a problem. The industry would need time to adjust in case of many large orders at the same time. It is not possible to turn on and off, as it could take years to adapt to a new demand situations. On the other hand, if the company is small or medium size, then the time between orders cannot be too long because the company would then have to adapt and perhaps turn to the civil market. The companies benefit from an even production capacity in order to maintain competence. Some companies did not want to grow too fast from previous experience of having to downsize. Here the

focus is on building capacity around subsidiaries and local partners with ongoing orders.

When asked what would happen if domestic and international demand were to increase significantly and at the same time, the interviewees answered that this was not very likely either, at least not to the extent that it would become a problem. But if this were the case, priorities would vary depending on the situation. The domestic market would be prioritised if it were the main customer or in times of conflict. Some companies stated that they did not have the luxury to prioritise and that it was a matter of treating all customers fairly. Some of the interviewees would prioritise the export market, as long as the domestic security situation is stable and they had their home government's blessing. This in order to maintain business activity and economies of scale, something which the home governments are often keen on letting the companies pursue. Export contracts often entail production together with local partners, which helps to solve the capability issue. These partners however, need to be properly trained.

The companies' role in maintenance often varied, some having a large role and others virtually none. This partly varied depending on the product. Companies often coordinate production with maintenance and other post-procurement services. There is a varying degree of how much countries depend on defence companies for maintenance and how much they can do themselves. Here the competence of local partners is important.

Research and Development

Research and development (R&D) within the defence industry is very often project specific. The defence industry differs from most other sectors as defence companies usually need an order from a customer before starting to develop a product. Project specific R&D is typically provided by the government in connection to a contract. The interviewees shared the view that governments in Europe did not spend sufficiently on R&D. Companies do have self-funded initiatives and R&D investments. Some companies have increased this share, partly because the government funded R&D has decreased but also in order to maintain their competitiveness. Many companies are concerned by the lack of sufficient investments in R&D and particularly Science and technology (S&T) by governments.

R&D is also conducted in connection with exports, often through extensive cooperation with partnerships involving the customer. This because export customers often want some form of development or adaptation. For companies with both civilian and military divisions, there were some R&D spill-overs, for instance production methods and material development. For some companies, there were also civil-military R&D cooperations involving the government and civil academia. There was some external dependence regarding vital components for some companies, especially from the US.

International cooperation

International cooperation is common within the industry and considered crucial by the interviewees. Companies cooperate either bilaterally, in groups or within their supply chains. For many of the interviewed companies, international cooperation is part of the company structure.

Perspectives of European cooperation programmes vary depending on which country the company originates from. European integration is noted for instance in the form of PESCO, but uncertainties remain over the outcome of Brexit. Some fear a rift in relationships and UK access to EU funds. This creates several challenges for international cooperation going forward.

Role of Subcontractors

Many of the companies interviewed are prime contractors, to which subcontractors are vital. The size of subcontractors varies greatly. Historically stagnant and often uneven demand has forced suppliers of components to shut down or shift customer base. Some companies advise their subcontractors not to solely depend on them. The challenges identified for the large prime contractors, who often are each-others subcontractors, become even more pronounced for SME subcontractors. SMEs have even more problems attracting skilled or educated labour. Even sustainable financing is also a problem for some smaller subcontractors.

To mitigate these challenges, most companies support subcontractors in some way or another. This could entail assisting subcontractors to move in a certain business direction, providing training and supporting management, certification as well as R&D efforts. It could also include investing in or buying and integrating suppliers.

3.3 Concluding Remarks

The findings from the interviews show that the European defence industry experiences a somewhat growing demand. However, European demand is more modest than that of the export markets. Some see it as cyclical due to the need to replace ageing equipment while others see it as structural due to increased spending. Some European defence companies have already started to adapt to increased growth while others are more cautious and do not want to increase production capacity before deeming it sustainable.

The European defence companies face tough competition on the international market, both from established competitors such as the US or Russia, but also emerging exporters as well as countries which are trying to develop their own defence industrial capabilities. The latter development provides both opportunities and challenges for European defence companies. It could mean new partnerships which in turn could lead to shared costs, but at the same time it could create competitors since there will likely be requirements to share technology.

The largest overall challenge according to the interviewees, both currently and in case of an increased demand, is finding skilled labour. For most of the companies the lack is mainly within highly skilled engineers. In this category there is competition with the IT and finance sectors. This challenge was seen as even more pronounced for sub-contractors. These are often SMEs and will have an even harder time attracting labour and maintaining their competitiveness. This picture is confirmed by a report from the European Commission.²²⁰ The prime contractors often help subcontractors in some form or the other, but ultimately SMEs need either regular orders or if possible they need to diversify from being solely reliant on the defence industry.

In conclusion, the results from the interviews identify a deteriorating security environment, increased US protectionism, challenges in finding skilled labour, a need to support SMEs and insufficient investment in R&D. All these factors push towards a continued and increased coordination, cooperation and consolidation. Pooling and sharing of R&D and engineering talents should be of great interest to both European countries and defence companies. The global trends and challenges identified in this report highlight the continued incentives for cooperation within the European defence industry.

²²⁰ European Commission (2018), *Defence Industries*. (Accessed 20 November 2018).

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Appendix A: Military Expenditure

Table A.1: Top 10 Military Spenders in the World, 2017. Source: SIPRI (2018a)

Country	Billion USD (current prices)	Share of the World (%)	Share of GDP (%)	Average Change 2008-17 (%)	Average Change 2015-17 (%)
US	610	35.8	3.1	-1.5	-0.5
China	228	13.4	1.9	8.7	5.6
Saudi Arabia	69	4.1	10.3	4.3	N/A
Russia	66	3.9	4.3	4.1	-6.4
India	64	3.8	2.5	4.4	7.9
France	58	3.4	2.3	0.6	0.9
UK	47	2.8	1.8	-1.8	0.5
Japan	45	2.7	0.9	0.5	-0.2
Germany	44	2.6	1.2	1.0	3.9
South Korea	39	2.3	2.6	2.9	2.2

Appendix B: Equipment Quantities

All data concerning equipment quantities presented in the figures and tables of Appendix B has been compiled from the 2000, 2005, 2010, 2015 and 2018 issues of IISS *The Military Balance*. This data features some inconsistencies as both nomenclature and clustering of equipment into types vary over time. This may cause some minor inconsistencies in categorisation of equipment both within and between countries. When IISS has indicated that a certain type of equipment is in active service, but no exact quantities are given, that cell is marked with “some” in the tables of this appendix. Furthermore, there is no clarity in the status of the equipment placed in reserve. This may vary from being near operational to just being used for spare parts.

In the figures below, the equipment has then been divided into the three categories: Modern, Intermediate and Legacy. The purpose of this categorisation is to illustrate the trend of modernisation within each country. It is however not meant to indicate individual system performance over time, as the composition of a country’s military equipment may vary over time even within categories. For instance, several countries have moved from smaller to larger types of naval platforms over time. Furthermore, the categorisation does not capture differences in military performance between countries. For instance, the US Navy consists mainly of large aircraft carriers, cruisers and destroyers while the Chinese PLA Navy consists of mostly smaller destroyers, frigates and corvettes. There may also be differences between a modern US destroyer and a modern Chinese destroyer, which this simplified categorisation does not capture. The data in the figures below only includes the equipment of each country’s army, navy and air force. This means that this appendix does not include equipment held by for instance the US Marines, although such data may be included in future issues of this report series.

For surface combatants the categorisation is mainly based on which decade the ships were commissioned into active service. Surface combatants commissioned in 1950s and 1960s are classified as Legacy, while ships taken into service in 1970s and 1980s are classified as Intermediate and ships commissioned after 1990 are classified as Modern. There are some exemptions to this rule. The most notable is the surface combatants for China’s PLA Navy. During the 1980s and 1990s China mainly of copied or adapted older Soviet designs, it is only during the 2000s that China has begun to produce modern surface combatants. Therefore, surface combatant classification of the Chinese PLA Navy lags with a decade compared to the other countries. The *Sovremenny* destroyers were bought by China in the early 2000, but since it is an older design classified as Intermediate for the Russian Navy, they are classified as Intermediate for China as well. Another exemption is the Ticonderoga Class cruiser of the US Navy. This cruiser class was commissioned in the 1980s, but since it carries the advanced AEGIS combat system and has few international competitors it is classified as modern. There is one conscious

inconsistency between the figures. The Russian aircraft carrier *Kuznetsov* is classified as Intermediate while the Chinese PLA Navy Liaoning is classified as modern, despite being sister ships of the same original class. The reason for this inconsistency is that the Liaoning was upgraded by China before being taken into service in 2012.

For main battle tanks the categorisation mainly corresponds with the accepted classification into generations. Third generation main battle tanks are classified as Modern, while second generation tanks are classified as Intermediate, and first generation tanks classified as Legacy. The identification according to generation has been done by a wide variety of open sources and literature.

For fighters and attack aircraft the categorisation also chiefly corresponds with the accepted classification into generations. Fifth and fourth generation multirole fighters are classified as Modern, while third are classified as Intermediate, and second generation fighters are classified as Legacy. Fifth and fourth generation fighters were mainly commissioned after the 1990s, while third generation fighters were usually taken into service in the late 1960s to the 1980s and second generations fighters were commissioned in the late 1950s and early 1970s. The identification according to generation has been done by a wide variety of open sources and literature.

Russia

Russian Navy Surface Combatants

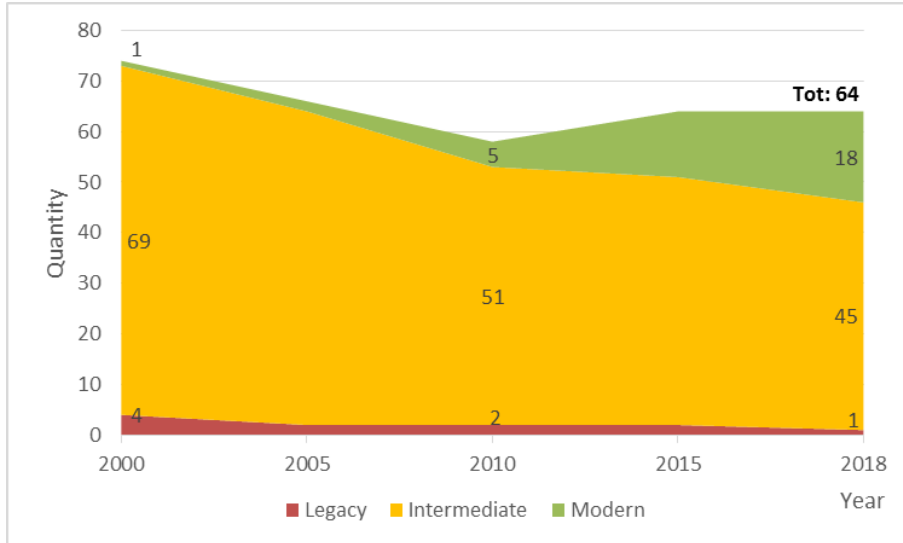


Figure B.1: Russian Navy Surface Combatants. Source: IISS

Modern includes frigates; *Krivak V*, *Gepard*, *Neustrashimyy*, corvettes; *Steregushchiy*, *Buyan/M*. Intermediate includes aircraft carrier; *Kuznetsov*, cruisers; *Kirov*, *Slava*, destroyers; *Udaloy I/II*, *Sovremenny*, frigates; *Krivak II*, *Krivak I*, corvettes; *Parchim II*, *Grisha I/III/IV/V*. Legacy includes cruisers; *Kara*, *Kynda*, destroyers; *Kashin mod.*, *Kashin*.

Table B.1: Russian Navy Surface Combatants. Source: IISS.

	2000	2005	2010	2015	2018
Aircraft Carriers	1	1	1	1	1
<i>Kuznetsov</i>	1	1	1	1	1
Cruisers	7	6	5	5	4
<i>Kirov</i>	2	2	1	1	1
<i>Slava</i>	3	3	3	3	3
<i>Kara</i>	1	1	1	1	-
<i>Kynda</i>	1	-	-	-	-
Destroyers	17	15	14	15	13
<i>Udaloy I/II</i>	8	8	8	9	9
<i>Sovremenny</i>	7	6	5	5	3
<i>Kashin mod.</i>	1	1	1	1	1
<i>Kashin</i>	1	-	-	-	-
Frigates	10	7	7	6	7
<i>Krivak V</i>	-	-	-	-	2

<i>Gepard</i>	-	1	1	2	2
<i>Neustrashimyy</i>	1	1	2	2	1
<i>Krivak II</i>	2	2	2	1	1
<i>Krivak I</i>	7	3	2	1	1
Corvettes	39	37	31	37	39
<i>Steregushchiy</i>	-	-	1	4	5
<i>Buyan/M</i>	-	-	1	5	8
<i>Parchim II</i>	12	12	7	7	6
<i>Grisha I/III/IV/V</i>	27	25	22	21	20
Total	74	66	58	64	64

Russian Army Main Battle Tanks

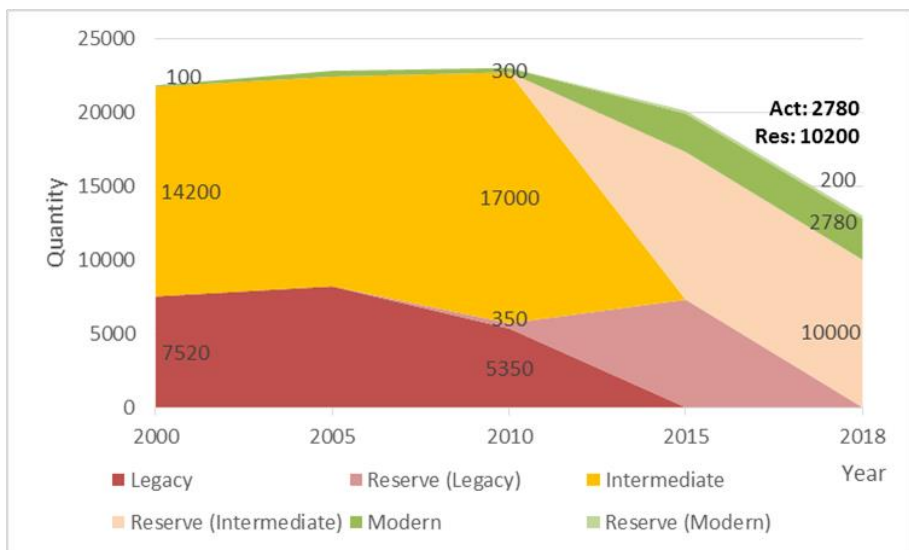


Figure B.2: Russian Army Main Battle Tanks. Source: IISS

Modern includes; *T-90/A*, *T-80BV/U*, *T-72B3*, *T-72B/BA*. Intermediate includes; *T-80/U/UD/UM*, *T-72/L/M*. Legacy includes; *T-64A/B*, *T-62*, *T-55*. A large share of Russian main battle tanks are currently held in reserve. Modern in reserve includes; *T-90/A*. Intermediate in reserve includes; various versions of *T-80*, various versions of *T-72*. Legacy in reserve includes; *T-64A/B*, *T-62*, *T-55*.

Table B.2: Russian Army Main Battle Combatants. Source: IISS.

	2000	2005	2010	2015	2018
T-90/A (Active)	100	400	300	350	350
T-90/A (Reserve)	-	-	-	200	200
T-80BV (Active)	-	-	-	550	450
T-80/U/UD/UM (Active)	4500	4500	4500	-	-
T-80 Various (Reserve)	-	-	-	3000	3000
T-72B3/B3 mod. (Active)	-	-	-	400	880
T-72B/BA (Active)	-	-	-	1300	1100
T-72/L/M (Active)	9700	9700	12500	-	-
T-72 Various (Reserve)	-	-	-	7000	7000
T-64A/B (Active)	4300	4000	4000	-	-
T-64A/B (Reserve)	-	-	-	2000	-
T-62 (Active)	2020	3000	150	-	-
T-62 (Reserve)	-	-	350	2500	-
T-55 (Active)	1200	1200	1200	-	-
T-55 (Reserve)	-	-	-	2800	-
Active	21820	22700	22650	2600	2780
Reserve	0	0	350	17500	10200
Total	21820	22700	23000	20100	12980

Russian Air Force Fighter and Attack Aircraft

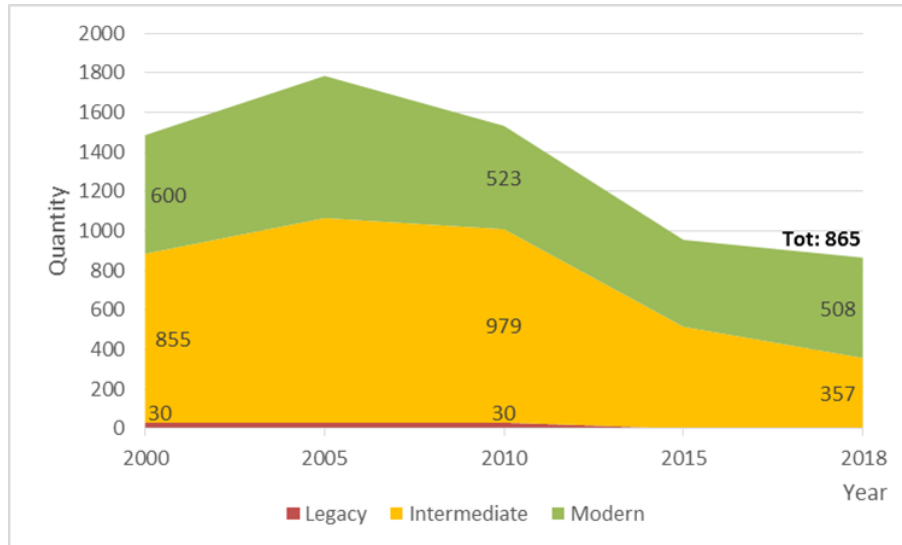


Figure B.3: Russian Air Force Fighter and Attack Aircraft. Source: IISS

Modern includes; *Su-35S*, *Su-34*, *Su-30/M2/SM*, *Su-27/UB/SM2/SM3*, *MiG-29*. Intermediate includes; *Su-25A/SM/UB*, *Su-24*, *MiG-31*. Legacy includes; *MiG-25A/E*.

Table B.3: Russian Air Force Fighter and Attack Aircraft. Source: IISS.

	2000	2005	2010	2015	2018
<i>Su-35S Flanker</i>	-	-	-	-	70
<i>Su-34 Fullback</i>	-	2	16	46	98
<i>Su-30/M2/SM</i>	-	-	-	29	99
<i>Su-27/UB/SM2/SM3</i>	340	371	281	181	121
<i>MiG-29 Fulcrum</i>	260	347	226	184	120
<i>Su-25A/SM/UB Frogfoot</i>	225	305	241	215	195
<i>Su-24 Fencer</i>	350	451	550	150	70
<i>MiG-31 Foxhound</i>	280	279	188	150	92
<i>MiG-25A/E Foxbat</i>	some	30	30	-	-
Total	1455	1785	1532	955	865

The figures in this report differs from Russia's own assessment of modern equipment.²²¹ The largest discrepancy between this report's and Russia's own assessment is among surface combatants. This difference is likely due to different definitions of the term "modern". While his report only includes new equipment, Russia may include upgraded equipment, but this has not been confirmed.

Russian Estimates of Modern Equipment

Table B.R: Reported Share of Modern Equipment (2020 = target)

Type of Weapons System	2013	2015	2017	2020
Surface Combatants	41%	44%	54%	71%
Aircraft	23%	37%	55%	71%
Armoured Vehicles	20%	37%	56%	82%

Regarding Armoured Vehicles it is difficult to identify the cause of the discrepancy since the Russian estimates on this type of system is not directly comparable to the Main Battle Tanks categorised in this report. It is also worth to note that while the Russian estimates on Aircraft seems to correspond fairly well with this report's estimates on Combat Aircraft, these estimates may still include different types of aircraft.

²²¹ Collected from Connolly, Richard & Sendstad, Cecilie (2017). "Russia's Role as an Arms Exporter – The Strategic and Economic Importance of Arms Exports for Russia". Research Paper, Chatham House, March 2017.

France, the UK and Germany

French, UK and German Navy Surface Combatants

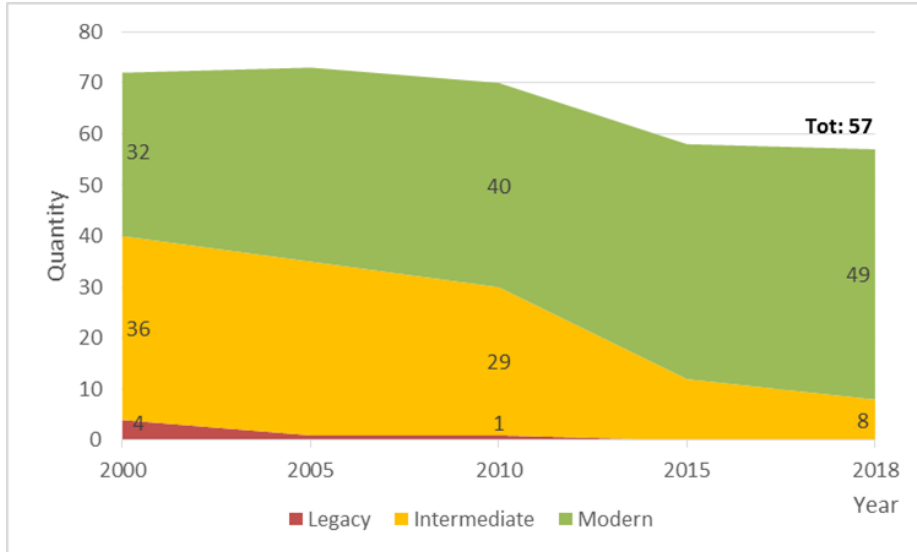


Figure B.4: French, UK and German Navy Surface Combatants. Source: IISS

Modern includes aircraft carrier; *Charles de Gaulle*, *Queen Elizabeth*, *Invincible mod.*, destroyers; *Aquitaine*, *Forbin*, Type 45, frigates; *La Fayette*, *Floreal*, Type 23, *Sachsen*, *Brandenburg*, corvettes; *Braunschweig*. Intermediate includes aircraft carrier; *Invincible*, destroyers; *Cassard*, *Georges Leygues*, *Tourville*, Type 42 Batch 3, Type 42 Batch 1/Batch2, frigates; Type 22 Batch 3, Type 22 Batch 2, *Bremen*. Legacy includes aircraft carrier; *Clémenceau*, cruisers; *Jeanne d'Arc*, destroyers; *Lütjens*.

Table B.4: French, UK and German Navy Surface Combatants. Source: IISS.

	2000	2005	2010	2015	2018
Aircraft Carriers	4	3	3	1	2
<i>Charles de Gaulle</i>	-	1	1	1	1
<i>Queen Elizabeth</i>	-	-	-	-	1
<i>Invincible mod.</i>	2	2	2	-	-
<i>Invincible</i>	1	-	-	-	-
<i>Clémenceau</i>	1	-	-	-	-
Cruisers	1	1	1	-	-
<i>Jeanne d'Arc</i>	1	1	1	-	-
Destroyers	25	24	20	17	17
<i>Aquitaine</i>	-	-	-	1	3
<i>Forbin</i>	2	2	2	2	2

<i>Type 45</i>	-	-	1	6	6
<i>Cassard</i>	2	2	2	2	2
<i>Georges Leygues</i>	6	7	7	6	4
<i>Tourville</i>	2	2	2	-	-
<i>Type 42 Batch 3</i>	4	4	4	-	-
<i>Type 42 Batch ½</i>	7	7	2	-	-
<i>Lütjens</i>	2	-	-	-	-
Frigates	42	45	43	35	33
<i>La Fayette</i>	4	5	5	5	5
<i>Floreal</i>	6	6	6	6	6
<i>Type 23</i>	14	16	13	13	13
<i>Sachsen</i>	-	2	3	3	3
<i>Brandenburg</i>	4	4	4	4	4
<i>Type 22 Batch 3</i>	4	4	4	-	-
<i>Type 22 Batch 2</i>	2	-	-	-	-
<i>Bremen</i>	8	8	8	4	2
Corvettes	0	0	3	5	5
<i>Braunschweig</i>	-	-	3	5	5
Total	72	73	70	58	57

French, UK and German Army Main Battle Tanks

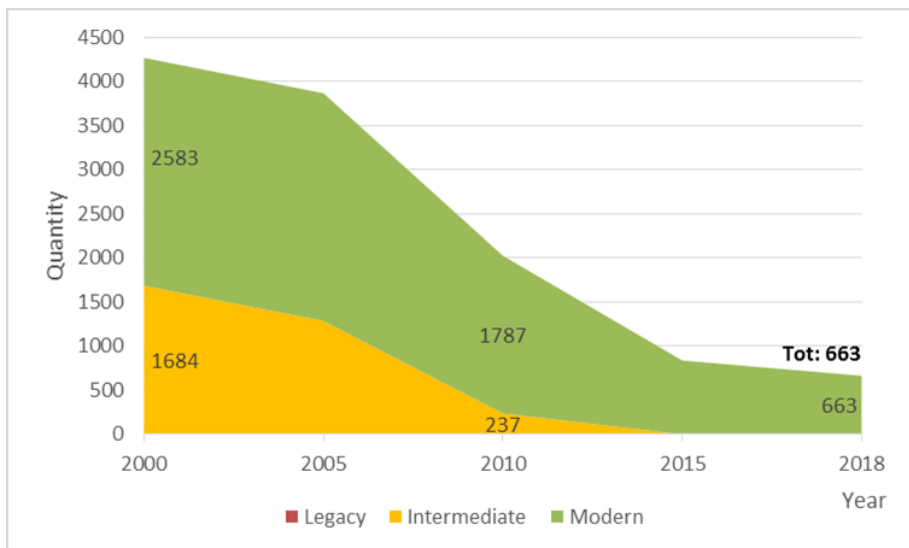


Figure B.5: French, UK and German Army Main Battle Tanks. Source: IISS

Modern includes; *Leclerc*, *Challenger 2*, *Challenger 1*, *Leopard 2A7/2A6/2A4*. Intermediate includes; *AMX-30/B2*, *Chieftain*, *Leopard 1A1/A3/A4/A5*. Legacy includes; none.

Table B.5: UK, French and German Army Main Battle Tanks. Source: IISS.

	2000	2005	2010	2015	2018
<i>Leclerc</i>	199	312	400	200	200
<i>Challenger 2</i>	192	386	386	227	227
<i>Challenger 1</i>	410	156	-	-	-
<i>Leopard 2A7</i>	-	-	-	-	19
<i>Leopard 2A6</i>	-	-	-	410	217
<i>Leopard 2A4</i>	1782	1728	1001	-	-
<i>AMX-30/B2</i>	635	614	237	-	-
<i>Chieftain</i>	16	1	-	-	-
<i>Leopard 1A1/A3/A4/A5</i>	1033	670	-	-	-
Total	4267	3867	2024	837	663

French, UK and German Air Force Fighter and Attack Aircraft

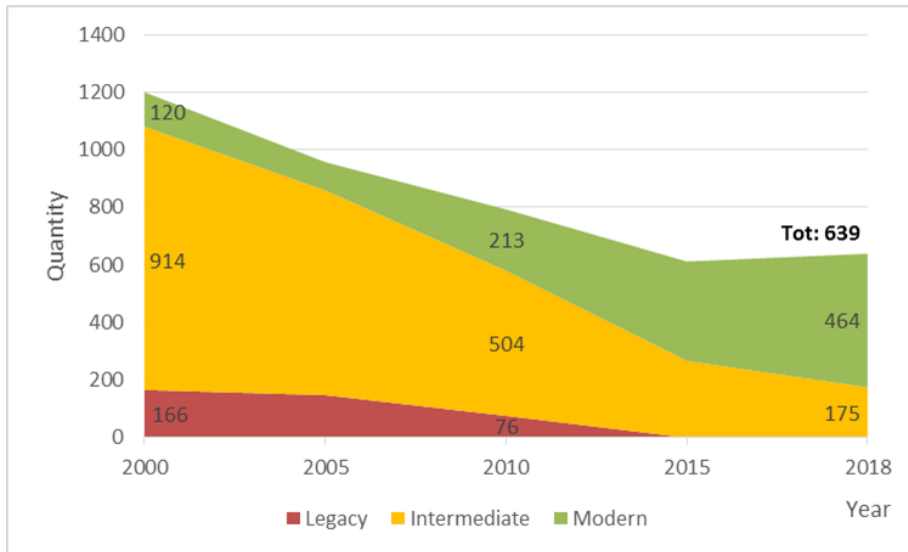


Figure B.6: French, UK and German Fighter and Attack Aircraft. Source: IISS

Modern includes; *Rafale B/C*, *Mirage 2000D/N*, *F-35A*, *Eurofighter*. Intermediate includes; *Mirage 2000B/C/-5*, *Mirage F-1B/CT*, *Mirage F-1R*, *Tornado F-3*, *Tornado GR4*, *Harrier GR7/GR9*, *Jaguar GR3*, *Tornado IDS*, *MiG-29*. Legacy includes; *F-4F*, *F-104*, *Su-22*, *MiG-23*, *MiG-21*.

Table B.6: French, UK and German Air Force Fighter and Attack Aircraft. Source: IISS.

	2000	2005	2010	2015	2018
<i>Rafale B/C</i>	-	5	51	68	100
<i>Mirage 2000D/N</i>	120	67	66	60	89
<i>F-35A Lightning II</i>	-	-	-	3	13
<i>Eurofighter Typhoon (UK)</i>	-	17	58	113	139
<i>Eurofighter Typhoon (Ger.)</i>	-	9	38	101	123
<i>Mirage 2000B/C/-5</i>	114	110	74	40	41
<i>Mirage F-1B/CT</i>	73	43	22	-	-
<i>Mirage F-1R</i>	40	43	39	-	-
<i>Tornado F-3</i>	93	91	12	-	-
<i>Tornado GR4</i>	121	88	113	90	46
<i>Harrier GR7/GR9</i>	64	50	55	-	-
<i>Jaguar GR3 (UK)</i>	53	24	-	-	-
<i>Tornado IDS</i>	267	262	189	137	88
<i>Jaguar (Ger.)</i>	66	-	-	-	-
<i>MiG-29</i>	23	-	-	-	-
<i>F-4F Phantom II</i>	154	145	76	-	-
<i>F-104</i>	8	-	-	-	-
<i>Su-22</i>	1	-	-	-	-
<i>MiG-23</i>	2	2	-	-	-
<i>MiG-21</i>	1	1	-	-	-
Total	1200	957	793	612	639

The US

US Navy Surface Combatants

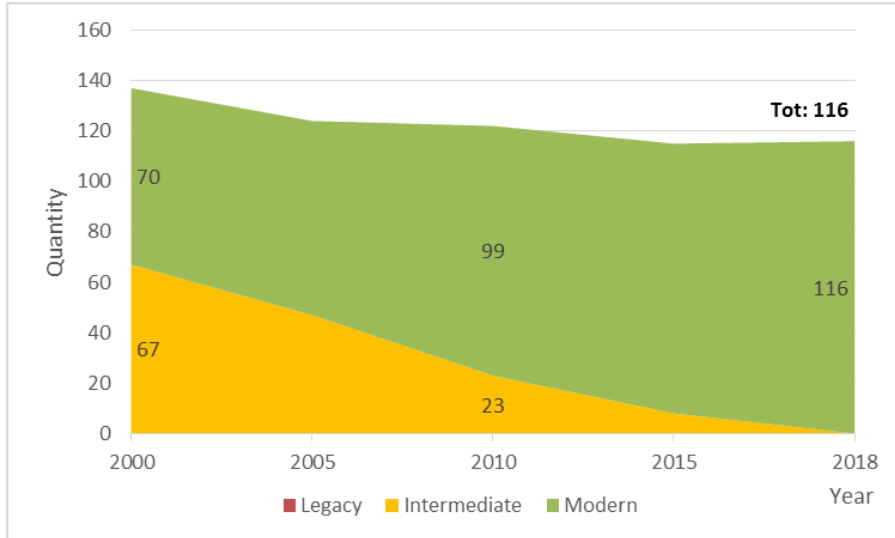


Figure B.7: US Navy Surface Combatants. Source: IISS

Modern includes aircraft carriers and amphibious assault ships; *Gerald R. Ford*, *Nimitz*, *Enterprise*, *America*, *Wasp*, cruisers; *Ticonderoga*, destroyers; *Zumwalt*, *Arleigh Bourke Flight IIA*, *Arleigh Bourke Flight I/II*, littoral combat ships; *Freedom* and *Independence*. Intermediate includes aircraft carriers and amphibious assault ships; *John F. Kennedy*, *Kitty Hawk*, *Tarawa*, destroyers; *Spruance*, frigates; *Oliver Hazard Perry*. Legacy includes; none.

Table B.7: US Navy Surface Combatants. Source: IISS.

	2000	2005	2010	2015	2018
Aircraft Carriers	12	11	11	10	11
<i>Gerald R. Ford</i>	-	-	-	-	1
<i>Nimitz</i>	8	8	10	10	10
<i>Enterprise</i>	1	1	1	-	-
<i>John F. Kennedy</i>	1	1	-	-	-
<i>Kitty Hawk</i>	2	1	-	-	-
Amphibious Assault	11	12	10	10	9
<i>America</i>	-	-	-	1	1
<i>Wasp</i>	6	7	8	8	8
<i>Tarawa</i>	5	5	2	1	-
Cruisers	27	22	22	22	22
<i>Ticonderoga</i>	27	22	22	22	22
Destroyers	52	49	56	62	65

<i>Zumwalt</i>	-	-	-	-	1
<i>Arleigh Bourke Flight IIA</i>	-	11	28	34	36
<i>Arleigh Bourke Flight I/II</i>	28	28	28	28	28
<i>Spruance</i>	24	10	-	-	-
Frigates and LCS:s	35	30	23	11	9
<i>Freedom</i>	-	-	1	2	4
<i>Independence</i>	-	-	1	2	5
<i>Oliver Hazard Perry</i>	35	30	21	7	-
Total	137	127	122	115	116

US Army Main Battle Tanks

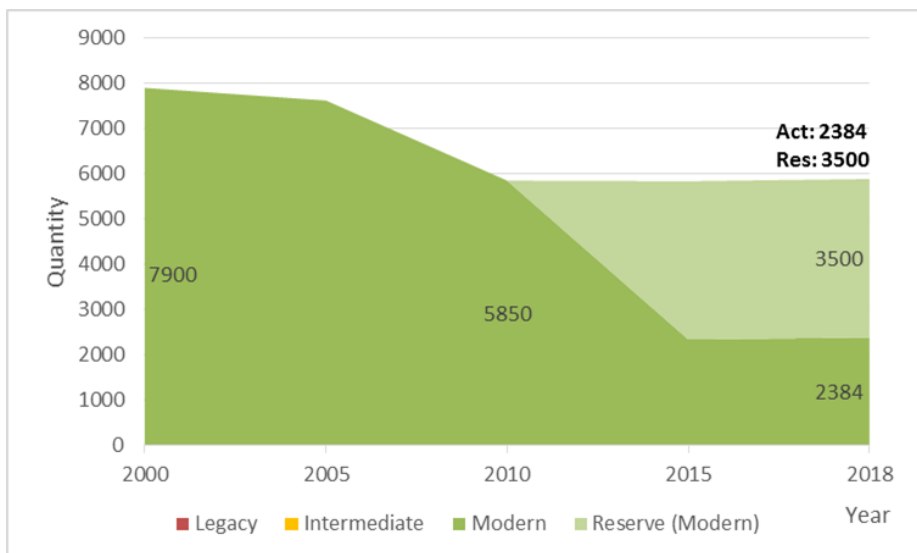


Figure B.8: US Army Main Battle Tanks. Source: IISS

Modern includes; *M1A2 Abrams*, *M1A1 Abrams*, *M1 Abrams*. Intermediate includes; none. Legacy includes; none. Some US main battle tanks are currently held in reserve. Modern in reserve includes; *M1A2 Abrams*, *M1A1 Abrams*, *M1 Abrams*. Intermediate in reserve includes; none. Legacy in reserve includes; none.

Table B.8: US Army Main Battle Tanks. Source: IISS.

	2000	2005	2010	2015	2018
<i>M1A2 Abrams</i> (Active)	some	some	some	some	1609
<i>M1A1 Abrams</i> (Active)	some	7620	5850	2338	775
<i>M1 Abrams</i> (Active)	7900	-	-	-	-
<i>M1/M1A1/A2</i> (Reserve)	-	-	-	3500	3500
Active	7900	7620	5850	2338	2384
Reserve	0	0	0	3500	3500
Total	7900	7620	5850	5838	5884

US Air Force Fighter and Attack Aircraft

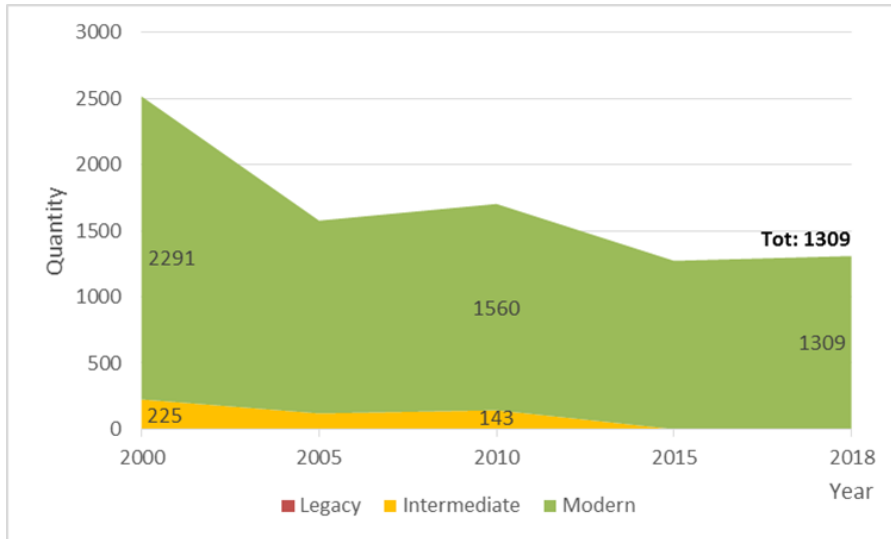


Figure B.9: US Air Force Fighter and Attack Aircraft. Source: IISS

Modern includes; *F-35*, *F-22*, *F-16A/B/C/D*, *F-15E*, *F-15 A/B/C/D*, *F-117*, *OA-10A/A-10C*. Intermediate includes; *A-10A*. Legacy includes; none.

Table B.9: US Air Force Fighter and Attack Aircraft. Source: IISS.

	2000	2005	2010	2015	2018
<i>F-35A Lightning II</i>	-	-	-	42	122
<i>F-22A Raptor</i>	6	16	139	159	159
<i>F-16A/B/C/D</i>	1420	713	738	585	570
<i>F-15E Strike Eagle</i>	210	212	217	211	211
<i>F-15A/B/C/D Eagle</i>	494	381	396	116	106
<i>F-117 Nighthawk</i>	52	51	-	-	-
<i>OA-10A/A-10C</i>	109	85	70	160	141
<i>A-10A Thunderbolt</i>	225	119	143	-	-
Total	2516	1577	1703	1273	1309

China

PLA Navy Surface Combatants

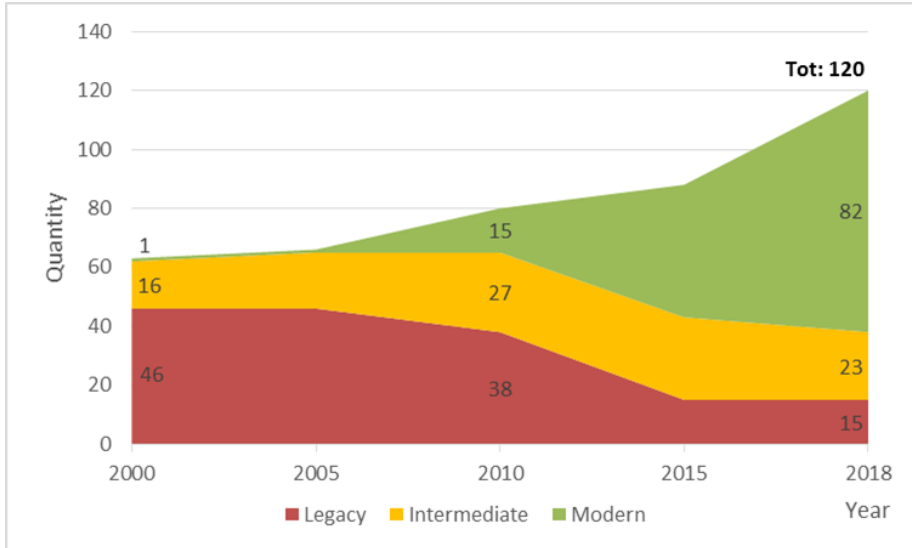


Figure B.10. PLA Navy Larger Surface Combatants. Source: IISS

Modern includes aircraft carrier; *Type 001*, destroyers; *Type 052D*, *Type 052C*, *Type 052B*, *Type 051C*, *Type 051B*, frigates; *Type 054A*, *Type 054*, corvettes; *Type 056A*. Intermediate includes destroyers; *Sovremenny*, *Type 052*, frigates; *Type 053H3*, *Type 053H2G*, *Type 053H1G/H1Q*. Legacy includes destroyers; *Type 051D/G*, frigates; *Type 053H/H1/H2*.

Table B.10. PLA Navy Larger Surface Combatants. Source: IISS.

	2000	2005	2010	2015	2018
Aircraft Carriers	-	-	-	1	1
<i>Type 001 Liaoning</i>	-	-	-	1	1
Destroyers	20	21	28	23	29
<i>Type 052D</i>	-	-	-	1	6
<i>Type 052C</i>	-	-	2	5	6
<i>Type 052B</i>	-	-	2	2	2
<i>Type 051C</i>	-	-	2	2	2
<i>Type 051B</i>	1	1	1	1	1
<i>Sovremenny</i>	1	2	4	4	4
<i>Type 052</i>	2	2	2	2	2
<i>Type 051D/G</i>	16	16	15	6	6
Frigates	43	45	52	49	53
<i>Type 054A</i>	-	-	6	16	25
<i>Type 054</i>	-	-	2	2	2

Type 053H3	6	8	10	10	10
Type 053H2G	7	7	4	5	-
Type 053H1G/H1Q	-	-	7	7	7
Type 053H/H1/H2	30	30	23	9	9
Corvettes	0	0	0	15	37
Type 056/A	-	-	-	15	37
Total	63	66	80	88	120

PLA Ground Forces Main Battle Tanks

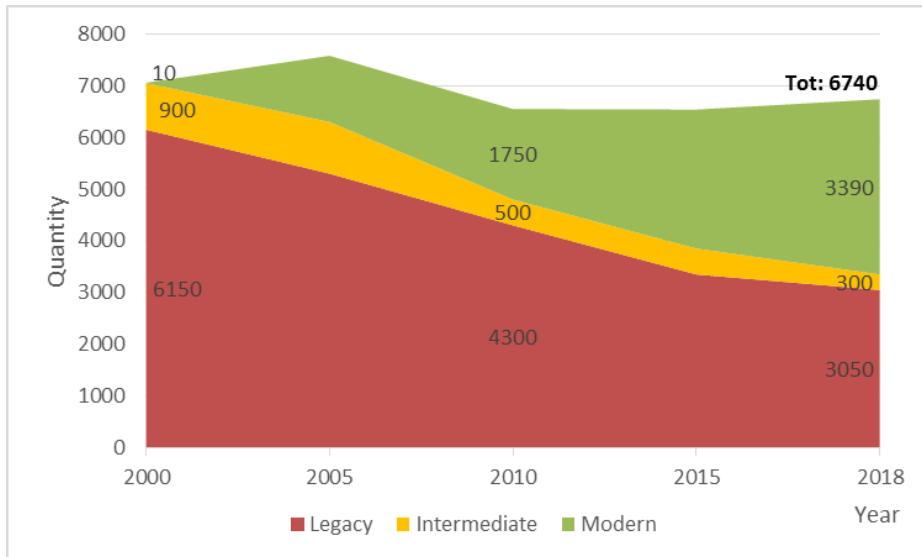


Figure B.11. PLA Ground Force Main Battle Tanks. Source: IISS

Modern includes; ZTZ-99A, ZTZ-98A/99, ZTZ-96/A. Intermediate includes; ZTZ-88A/B/C. Legacy includes; ZTZ-79, ZTZ-69-I, ZTZ-59/-I/-II/-D.

Table B.11. PLA Ground Force Main Battle Tanks. Source: IISS.

	2000	2005	2010	2015	2018
ZTZ-99A	-	-	-	100	250
ZTZ-98A/99	10	80	250	540	640
ZTZ-96/A	some	1200	1500	2050	2500
ZTZ-88A/B/C	900	1000	500	500	300
ZTZ-69-I/-79	650	300	300	300	200
ZTZ-59/-I/-II/-D	5500	5000	4000	3050	2850
Total	7060	7580	6550	6540	6740

PLA Air Force Fighter and Attack Aircraft

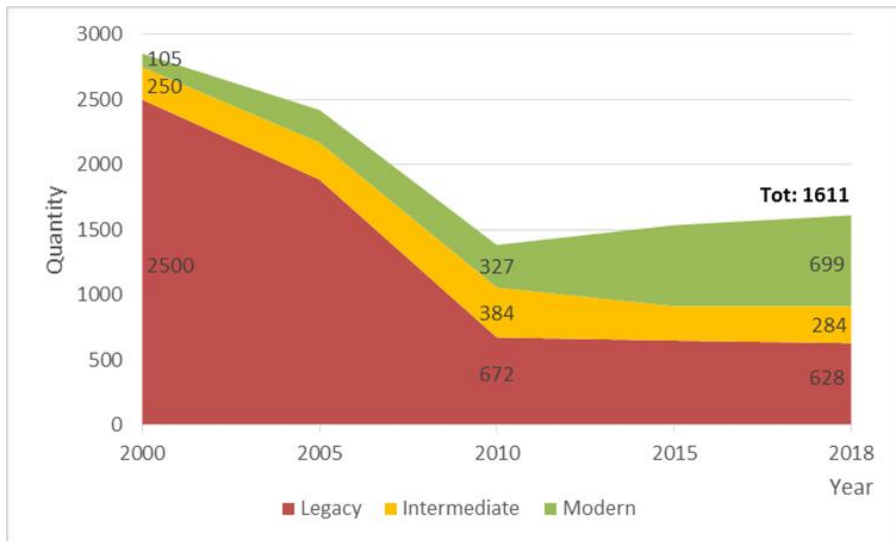


Figure B.12. PLA Air Force Fighter and Attack Aircraft. Source: IISS

Modern includes; *J-20*, *J-16*, *J-10S/B/C*, *J-10/A*, *Su-30MKK*, *J-11B/BS*, *J-11/Su-27*. Intermediate includes; *JH-7/A*, *J-8A/B/E*. Legacy includes; *J-7/II/III/E*, *Q-5/C/D/E*, *J-6/B/C/D/E*.

Table B.12. PLA Air Force Fighter and Attack Aircraft. Source: IISS.

	2000	2005	2010	2015	2018
<i>J-20</i>	-	-	-	-	6
<i>J-16</i>	-	-	-	-	16
<i>J-10S/B/C Firebird</i>	-	-	-	48	127
<i>J-10/A Firebird</i>	-	62	120	122	220
<i>Su-30MKK Flanker</i>	40	73	73	73	73
<i>J-11B/BS</i>	-	-	-	110	110
<i>J-11/Su-27 Flanker</i>	65	116	134	170	147
<i>JH-7/A</i>	-	39	72	120	140
<i>J-8A/B/E</i>	250	245	312	144	144
<i>J-7/II/III/E</i>	700	756	552	528	528
<i>Q-5/C/D/E</i>	300	408	120	120	100
<i>J-6/B/C/D/E</i>	1500	722	-	-	-
Total	2855	2421	1383	1535	1611

This report is the second in a biennial series Defence Economic Outlook (DEO), produced by the Swedish Defence Research Agency (FOI) at the request of the Swedish Ministry of Defence. The DEO report series consists of two parts; a recurring global outlook and a special theme. The theme of DEO 2018 features an analysis of the European defence industry's response to an increased demand for military equipment.

The global power balance is gradually changing. While the US and its NATO allies still have a significant advantage in terms of military spending and modern equipment, major powers such as China and Russia are steadily narrowing the capability gap. However, after decades of combating terrorism and insurgencies, the US is currently increasing its capability to counter near peer competitors. Meanwhile, several European countries are striving to increase their national defence capabilities with increased military spending and investment in equipment. Following decades of stagnant or declining defence budgets, this development might present both opportunities and challenges for the European defence industry.