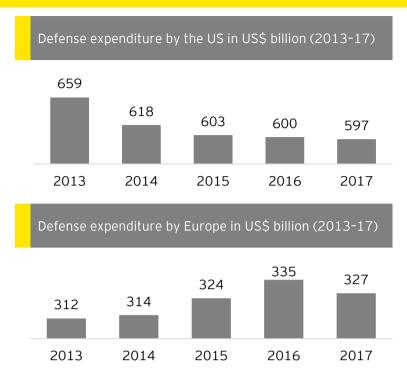


Why is it important for A&D players to look at emerging markets?

In recent years, the global aerospace and defense (A&D) market has undergone a transition phase. During this phase, leading players have started pursuing opportunities in emerging and developing economies to address the pressure of their declining business in domestic markets.

During 2012-16, defense expenditure by the US, the top defense-spending nation, declined at an average annual rate of 2.4%. However, the proposed budget for 2019 recommends a significant increase in defense spending. Defense expenditure by Europe has increased at a 1.2% compound annual growth rate (CAGR) during the same period.

While the defense expenditure by developed economies is under pressure, emerging economies, especially in the Middle East and the Asia-Pacific, are gaining importance among defense equipment manufacturers. Growth of defense expenditure by countries in the Middle East and the Asia-Pacific regions would be driven by the ongoing need to monitor rising terrorist activities coupled with unstable geopolitical situations.



Source: Stockholm International Peace Research Institute (SIPRI), EY analysis

Comparison between developed and emerging markets* in terms of defense expenditure

	Developed markets	Emerging markets
CAGR in defense expenditure in local currency (2013-17)	2.2%	9.0%
Defense expenditure as percentage of GDP (2017)	5.4%	8.4%
Share of total government expenditure allocated to defense (2017)	2.0%	3.0%

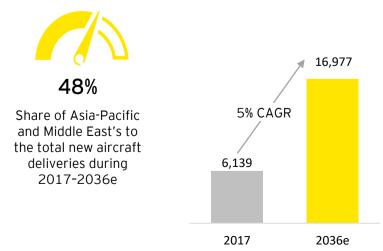
Source: EY analysis

Factors such as growing middle-class population, higher living standards, growth in travel and tourism, and low airfares are driving demand for commercial aerospace in major emerging economies. Over the next two decades, the domestic aviation market in China is expected to grow at a rapid pace and is set to become one of the largest air-travel markets in the world. In the Middle East, the central location of the airlines and their ability to connect to most parts of the world with one-stop flights would drive higher-than-average air-traffic growth on these routes. On the other hand, domestic air-traffic growth rates for mature markets, such as North America and Europe, would lag behind the global average.

Emerging markets, particularly those in the Middle East and Asia-Pacific are expected to account for close to half of the total commercial aircraft deliveries over the next two decades.

*Among top 50 countries in terms of 2017 defense expenditure

Expected growth in aircraft fleet size in Asia-Pacific and Middle East



Source: Airbus Global Market Forecast

Why is it important for A&D players to look at emerging markets? (contd)

As equally important as the demand for air travel are market liberalization, airport infrastructure development and environmental regulations. They help shape a positive long-term outlook for aircraft demand.

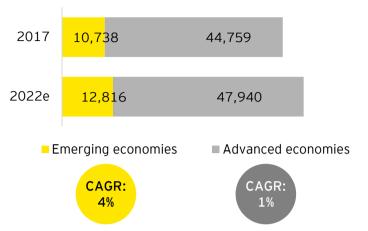
While the positive outlook for aircraft deliveries and defense expenditure makes emerging and developing economies the key markets for the export of A&D equipment and services, the positive outlook for GDP and foreign direct investment (FDI) suggests that they have a potential to emerge as A&D manufacturing hubs provided that they get the right impetus from the local governments. Emerging markets also fare better than developed markets in terms of outlook for key macroeconomic factors such as expected growth rate for capita GDP and FDI.

Given the uncertainties in defense expenditures at developed countries, coupled with significant growth potential in both defense and commercial aerospace businesses across emerging markets, many leading A&D players, mostly based in the US and Europe, have begun focusing on opportunities outside their home markets. They are seeking to increase their exports to key defense markets, while weighing the opportunities to grow their footprint in emerging markets – primarily through partnering with local players to create a local supply chain and set up manufacturing facilities and R&D centers.

One of the largest US-based defense companies formed a new business unit in 2013 to oversee its growth in international markets. As a part of its strategic plan to grow its international sales, the company continuously focused on strengthening its relationships with international customers through partnerships and joint technology efforts.

As a result of the company's continued focus on international business, its revenue share from international markets grew from 17% in 2013 to close to 30% in 2017, of which a significant share was derived from emerging economies – especially from the Middle East and Asia-Pacific. The company expects international markets to account for 50% of its orders by 2020.

GDP per capita, constant prices (purchasing power parity), US\$ billion_____

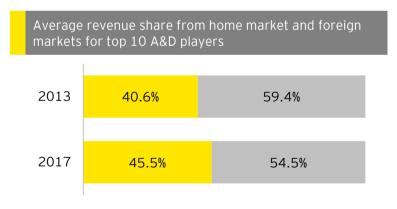


Source: International Monetary Fund (IMF)

FDI inflows to emerging economies



Source: Institute of International Finance (IIF)

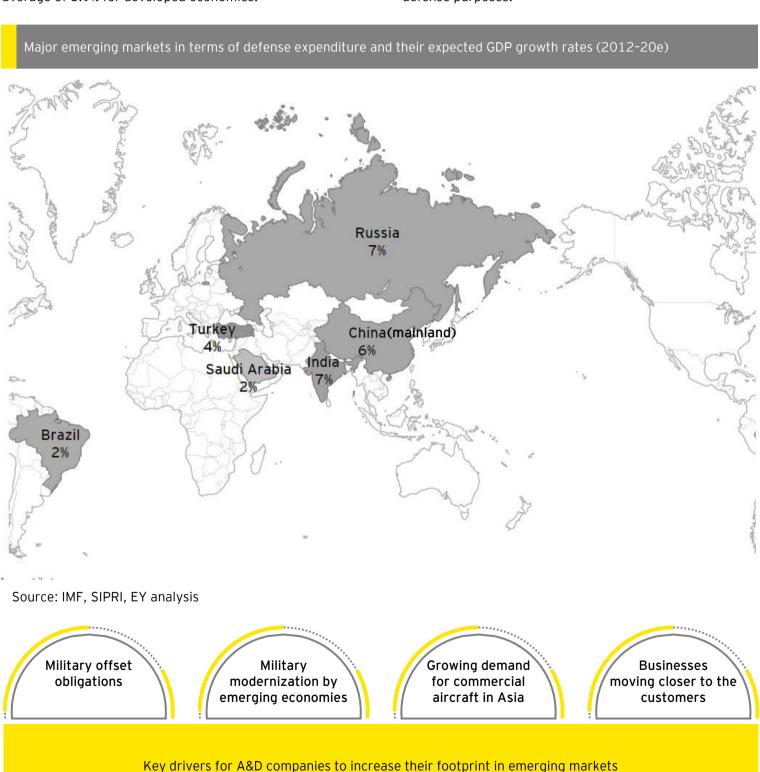


Revenue share from foreign marketsRevenue share from home market

Source: EY analysis

Defense expenditure by a country is very strongly correlated* with its GDP. Among the top 15 countries in terms of defense expenditure, six countries (China, Saudi Arabia, India, Russia, Brazil and Turkey) are emerging markets. These markets have an average expected GDP CAGR of 4.5%, during 2017-20, as compared to an average of 1.9% for developed economies.

In addition, other key factors, such as political stability, terrorist activities and relationships with neighbors, also play an important role in determining the level of defense expenditure of a country. Among emerging markets, countries with greater political instability and higher vulnerability to terrorist attacks tend to spend more for defense purposes.



^{*}An analysis of the top 100 defense-spending countries shows that the defense expenditure of a country is highly correlated with its GDP.

Given the increased defense spending in the emerging economies, companies continue to seek opportunities in these markets. Furthermore, the governments of most of these countries are seeking to modernize their armed forces. They are also focused on developing their local defense manufacturing base and encouraging global majors to invest in their local industries.

In commercial aerospace, these markets, especially China and India, would drive demand for new aircraft deliveries over the next two decades. This makes it beneficial for manufacturers to expand their operations and grow their footprint in these markets to bring their businesses closer to where their customers are.

However, some of these emerging markets are closed markets, thereby providing limited investment opportunities for foreign defense players – nevertheless, they still remain among the top countries in terms of defense spending. The growth of their domestic defense markets would be important to watch for. Furthermore, trade relations among these countries play a critical role in these markets.



India



Key highlights

- Focus on regional connectivity and airport infrastructure development under the regional connectivity scheme to support huge demand for air travel within the country
- Third largest capacity growth in the world for air traffic volume in 2016
- Fourth largest defense spending nation in the world in 2017
- Second largest defense importer in the world in 2017
- Defense offset in place requiring foreign suppliers to invest in the domestic industry
- Formation of a number of joint ventures (JVs) and partnerships with foreign defense players in recent years

Drivers for the A&D industry

- Domestic India expected to become the fifth largest route in the world by 2036 in terms of origin and destination air passenger flow
- Expectation to become the third largest commercial aviation market in the world by the early 2020s
- Territorial disputes and geopolitical tensions with neighboring countries
- Ongoing modernization of armed forces
- Focus of the Government on indigenization in defense manufacturing, in line with the "Make in India" initiative
- Ambition to emerge as a defense manufacturing hub and a key exporter of defense equipment

Russia



Key highlights

- Cooperation with China for long-range, wide-body passenger aircraft program
- Sixth largest defense-spending nation in the world in 2017
- Second largest defense exporter in the world in 2017
- Largely self-sufficient defense industry; focus on further reducing dependence on foreign suppliers of technology and parts
- Focus on modernization of armed forces and innovation-based development of defense-industrial complex under the 2015 National Security Strategy
- Restrictions laid by the US and EU on supply of dualuse products and technologies to Russia
- Focus on development of critical technologies for manufacturing competitive defense products

Drivers for the A&D industry

- Aging commercial aircraft fleet to drive demand for maintenance, repair and operations (MRO) and replacement aircraft
- Development of low-cost carriers within the region to spur demand for narrow-body aircraft
- Goal to maintain the country's position as a global military superpower
- Geopolitical tensions with the US, the EU and Ukraine
- Threat from terrorist groups operating in the Middle East

China



Key highlights

- Largest capacity growth in the world for air traffic volume in 2016
- Ongoing indigenous program for development of narrow-body passenger aircraft
- Second largest defense-spending nation in the world in 2017
- Sixth largest defense importer and eight largest defense exporter in the world in 2017
- Defence Science and Technology and Industry Plan (2016-20) to promote development of defense equipment, arms exports and civil-military collaborations
- Revision of Catalogue of Industries for Guiding Foreign Investment, permitting foreign players to manufacture civil satellites, civil helicopters and civil aircraft parts

Drivers for the A&D industry

- Air traffic in China's domestic routes expected to quadruple during 2017-36 – set to become the largest region for air traffic flow by 2036
- Cooperation with Russia for long-range, wide-body passenger aircraft program
- ► Threat from North Korea's ongoing nuclear program
- Aim to maintain the country's position as a global military superpower
- Border security issues and territorial claims in the East and South China Seas
- Efforts for military self-sufficiency
- Focus on dual-use technologies to leverage civilian expertise in military modernization

Turkey



Key highlights

- Twelfth largest defense exporter in the world in 2017
- ► 11.8% CAGR for defense export during 2013-17
- Development of the domestic defense industry through collaboration and cooperation with leading foreign players
- Defense offset in place requiring foreign suppliers to invest in the domestic industry
- Government efforts to develop select regions as A&D manufacturing clusters
- Focus on developing capabilities to manufacture ground vehicles, marine vessels and unmanned aerial vehicles domestically

Drivers for the A&D industry

- Domestic Turkey expected to become the 11th largest route in the world by 2036 in terms of origin and destination air passenger flow
- Increasing threat from terrorist and separatist groups
- Geopolitical tensions with neighboring countries and territorial disputes
- Collaboration among the Government, industry players and academia to develop the manufacturing capabilities of A&D clusters
- Vision to rank among the top 10 defense manufacturing countries in the world by 2023

Brazil



Key highlights

- Largest domestic air traffic market in Latin America in 2016
- Second largest country in Latin America in 2016 in terms of seats offered in international air routes
- Third largest domestic aviation market in the world in 2016
- Location of 6 of the 10 busiest airports in Latin America
- Defense offset measures to develop the manufacturing and technology capabilities of the domestic defense industry

Drivers for the A&D industry

- Domestic Brazil expected to become the eighth largest route in the world by 2036 in terms of origin and destination air passenger flow
- Well-established aerospace manufacturing sector; the only country in Latin America that manufactures commercial aeroplanes
- Modernization of defense systems
- Focus on development of domestic defense manufacturing capabilities
- Efforts to protect the Amazon region through protecting land rights, and fighting deforestation and illegal activities

Saudi Arabia



Key highlights

- Third largest defense-spending nation in the world in 2017
- The largest defense importer in the world in 2017
- Significant defense budget cut in 2016 due to pressure on the economy as a result of declining oil prices
- Aim to produce up to 50% of its defense equipment domestically by 2030
- Introduced an Economic Offset Program to encourage foreign companies to establish JVs for defense equipment with Saudi Arabia's domestic organizations

Drivers for the A&D industry

- Increasing threat from terrorist groups operating in the Middle East
- Modernization of armed forces
- Saudi Naval Expansion Programme II for modernization of Gulf-based eastern fleet
- Territorial disputes in the Persian Gulf
- Development of a national defense company Saudi Arabian Military Industries (SAMI) –through the Saudi Arabian Public Investment Fund (PIF) in 2017 to develop the domestic defense manufacturing capabilities

What are the road blocks for doing business in emerging markets?

While A&D companies are witnessing increased investment opportunities across emerging markets, various regulatory, infrastructure-related and geopolitical challenges impact their operations and investments in these countries. As a result, foreign players must take these road blocks into consideration while defining their market entry strategies and designing their route map for expansion of footprint in emerging economies.

Risks of copyright infringement and requirements for technology transfer

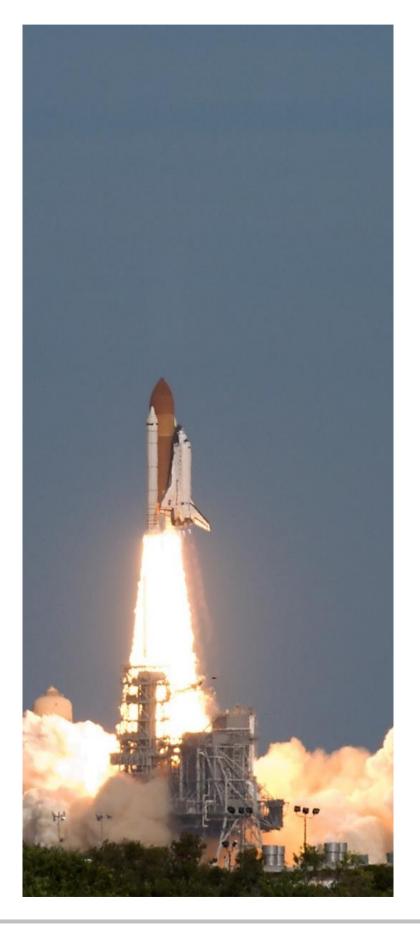
A&D companies enter into different types of confidentiality agreements, such as intellectual property (IP) agreements and non-disclosure agreements, with their partners in emerging markets to prevent disclosure of trade secrets and other proprietary information. However, in some cases, these measures may not be sufficient to prevent misappropriation of a confidential information. Furthermore, IP laws vary from one country to another. The protection provided to IP by the laws and courts of foreign nations may not be adequate for A&D players.

Moreover, some emerging countries require foreign A&D firms to transfer technology know-how to their local partners in the country, in order to operate in their defense market. This might expose some foreign players to the risk of IP rights violation and copyright infringements, especially in the case of niche and advance technologies.

Offset requirements

In many emerging countries, foreign A&D players need to abide by specific offset obligations to be able to supply defense equipment. The offset programs ensure that a part of government spending on the capital acquisition of defense products is repatriated into the local economy. As per the offset obligations, foreign A&D players selling defense products and services to these countries need to plough back a certain portion of their contract value into the local industry in forms of direct purchase, technology transfer and setting up facilities. As a result, foreign players incur a higher cost of doing defense business in those emerging markets.

In India, a foreign player must invest back 30% or more of the contract value in the Indian defense industry, provided the contract exceeds ~US\$300m (INR20b) in value. Similarly, Saudi Arabia has an offset requirement of 40% of total contract value, and most of the defense contracts are negotiated on a case-by-case basis.



What are the road blocks for doing business in emerging markets? (contd)

Export control regulations

Several developed economies impose licensing and export control restrictions on critical defense products to protect their national security interests and prevent large-scale production of weapons of mass destruction. These restrictions can be driven by evolving relations between countries.

Export restrictions on a large number of emerging markets may impose a significant financial impact on A&D players. As most of the A&D companies operate in a large number of markets, they are subject to different export restrictions across different markets.

Inadequate infrastructure for A&D manufacturing

Several emerging markets lack an adequate A&D ecosystem to address the capacity and capability requirements of foreign A&D players. As a result, to operate in these markets, foreign players need to reply on suppliers and partners and subcontractors located across the globe, which increases their overall logistics costs.

Additionally, many emerging countries possess a fragmented aftermarket along with an inadequate supply chain infrastructure. In these markets, foreign players need to invest in developing a local supply chain to support their footprint expansion.

Economic and geopolitical instability

Political and economic conditions of a country play an instrumental role in dictating the government's defense budget allocation. As many emerging countries continue to witness a volatile economic environment fueled by low capital inflows and tight global liquidity conditions, they can potentially experience volatility in their defense spending.

Additionally, many emerging countries lack stability in their defense and security landscape due to rising geopolitical tensions. While Middle East and North Africa face an increased need to counter terrorist threats, Asia-Pacific is witnessing ongoing tensions among its countries. These geopolitical factors are expected to increase defense spending across the emerging countries to monitor and protect their borders.

However, there is a shift in defense spending priorities of emerging countries toward high-value assets and defense information and technology (IT) adoption. As a result, A&D companies need to continuously adapt their offerings in response to the evolving defense needs of emerging countries.

"The slowing growth in emerging markets is surfacing as a top risk for original equipment manufacturers (OEMs) – suppliers now view slower growth in some emerging markets as a potential risk to the commercial OE cycle. For example, China's GDP growth is forecasted to decelerate modestly to 6.4% in 2018 on weaker property and infrastructure investment.

In India, the past year witnessed a real GDP growth slowdown with demonetization, implementation of goods and services tax, and general corporate deleveraging. However, these reforms are creating a foundation for a stronger medium-term growth outlook for India.

In Saudi Arabia, with oil prices battered in the last few years and economic growth slowing, GDP expansion dropped during 2014-16. The expectation is for sluggish growth in the near future, but having (possibly) turned the corner with oil prices back up above US\$70 per barrel, the worst may be over." – Hisham Barghout, EY Americas A&D Investment Banking Leader



How can A&D companies expand their footprint in emerging markets?

Global A&D players are focusing on a number of strategies to expand their footprint in emerging markets. While some of the key emerging markets are closed markets, many are gradually opening up to foreign investments. Strategies of global A&D players for doing business in individual markets differ from one country to another, depending on the nature of the market. However, on a broader perspective, most of the strategies involve not only selling to those markets but also working with the local governments to develop the A&D manufacturing ecosystem of the local markets. On the other hand, local players in the emerging economies are looking at opportunities to collaborate with foreign players and gain the experience and capabilities to emerge as important links in the global A&D ecosystem. This section discusses some of the key strategies adopted by global A&D players to expand their footprint in emerging economies while contributing to the development of the local industries.

Set up local manufacturing centers and build a local supply chain

A&D companies are increasingly entering into partnerships with local players in emerging countries to set up manufacturing centers. While foreign A&D firms are able to increase their geographic presence and reduce cost of production through these partnerships, the emerging countries benefit from enhanced defense capabilities and employment provided by the A&D players.

A&D companies are also roping in local players from emerging countries as their global suppliers for key parts and equipment. This not only helps them achieve cost efficiencies, but also contribute toward fulfilling offset obligations.

A European aircraft manufacturer operates a wholly owned subsidiary in Brazil that is involved in manufacturing and assembly of both civil and military helicopters. The European company also offers a variety of services in the country, including technical support and maintenance for military aircraft, satellite imaging, avionics, missile launch detector and spare parts for space systems.

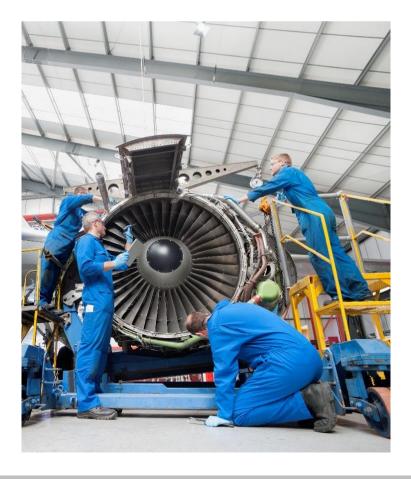
Focus on aftermarket opportunities in emerging markets

Most of the emerging countries have a fragmented and uncoordinated A&D aftermarket. In addition, aftermarket in these countries is characterized by inexperienced workforce, immature logistic network and regulatory oversight challenges. However, rapid growth of air traffic in these markets is expected to fuel demand for MRO services. As a result, foreign A&D players have opportunities to invest in MRO and aftermarket services in the emerging countries either through entering into partnerships with local MRO service providers or setting up their own facilities.

Engage in contracts involving technology transfer

Emerging countries are increasingly seeking to enter into defense contracts. This involves technology transfer from foreign A&D players in order to strengthen their indigenous manufacturing capability. Foreign A&D companies that share technologies with these countries enjoy enhanced collaborative opportunities for the development of local research, manufacturing and aftermarket capabilities in the local market.

One of the top five global A&D players in terms of revenue has signed a memorandum of agreement (MoA) with SAMI to transfer technology for installing weaponry on fixed and rotary-wing military aircraft in Saudi Arabia. The company additionally provides aftermarket services to the country.



How can A&D companies expand their footprint in emerging markets? (contd)

Set up R&D and innovation centers in emerging markets

A&D companies are continuously investing in setting up R&D and innovation centers in emerging countries with the aim of improving their operational excellence and cost optimization while leveraging the talent pool available in these countries. As part of this strategy, several companies enter into partnerships with local firms and universities for setting up their facilities, in turn gaining better access to local markets and capabilities.

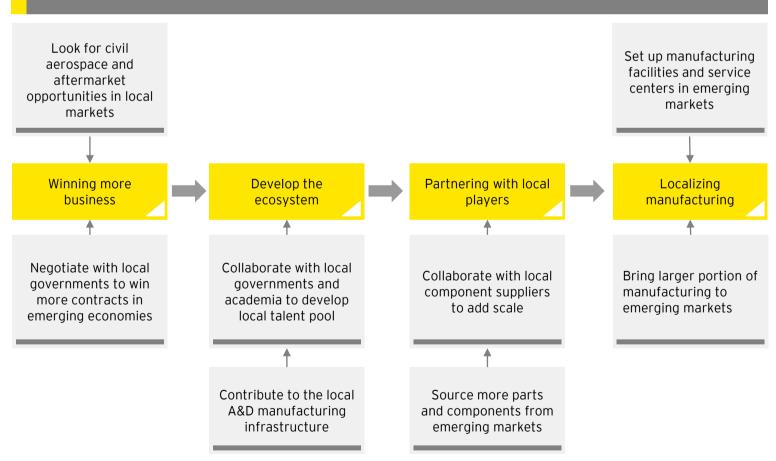
A leading aero-engine manufacturer has entered into a partnership with a Turkish player for design, development engineering and production activities of engines for military transportation aircraft. The two partners have also set up a technology development center in the country focused at developing new repair methods, and using advanced welding and robotic technologies for engine repairs.

Contribute to the development of a local talent base

Many emerging markets possess a significant gap between availability of skilled A&D workforce and their market demand. To address this challenge, foreign A&D players are increasingly undertaking training initiatives by partnering with government and private firms in these countries. These facilities enhance local talent in the region, in turn improving the availability of skilled labor for foreign firms.

A US-based A&D firm has launched an apprenticeship program to support aircraft maintenance skilling initiatives in partnership with one of India's government-owned enterprises' engineering wing and the Indian Ministry of Civil Aviation in order to develop a skilled aviation workforce, anticipating increase in demand for new aircraft in the near future.

Route map for global A&D players to increase their footprint in emerging markets



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