

# Dynamics of International Military Modernization 2016

Western Defense Industries Face Intensifying  
Global Competition



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An analysis of international defense  
spending patterns conducted by  
Avascent indicates rising challenges  
that threaten to undermine the  
longstanding primacy of U.S. and  
European suppliers from  
emerging non-Western players

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## Western Defense Industries Face Intensifying Global Competition

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### Executive Summary

Over the next 10 years, Western defense suppliers will face increased competition in international markets historically considered to be the near exclusive preserve of American and European firms.<sup>1</sup> Specifically, Western firms will see rising pressure from three vectors:

- The increasing number of countries seeking to satisfy requirements “internally”, from domestic defense industries, rather than importing from abroad;
- The growing role of emerging non-Western suppliers that are capable of competing against more established defense suppliers; and
- The encroachment of Chinese and Russian suppliers in markets formerly aligned with Western sources.

While U.S. and European companies retain a number of critical advantages, they increasingly compete in a marketplace that requires new business strategies and penalizes the status quo.

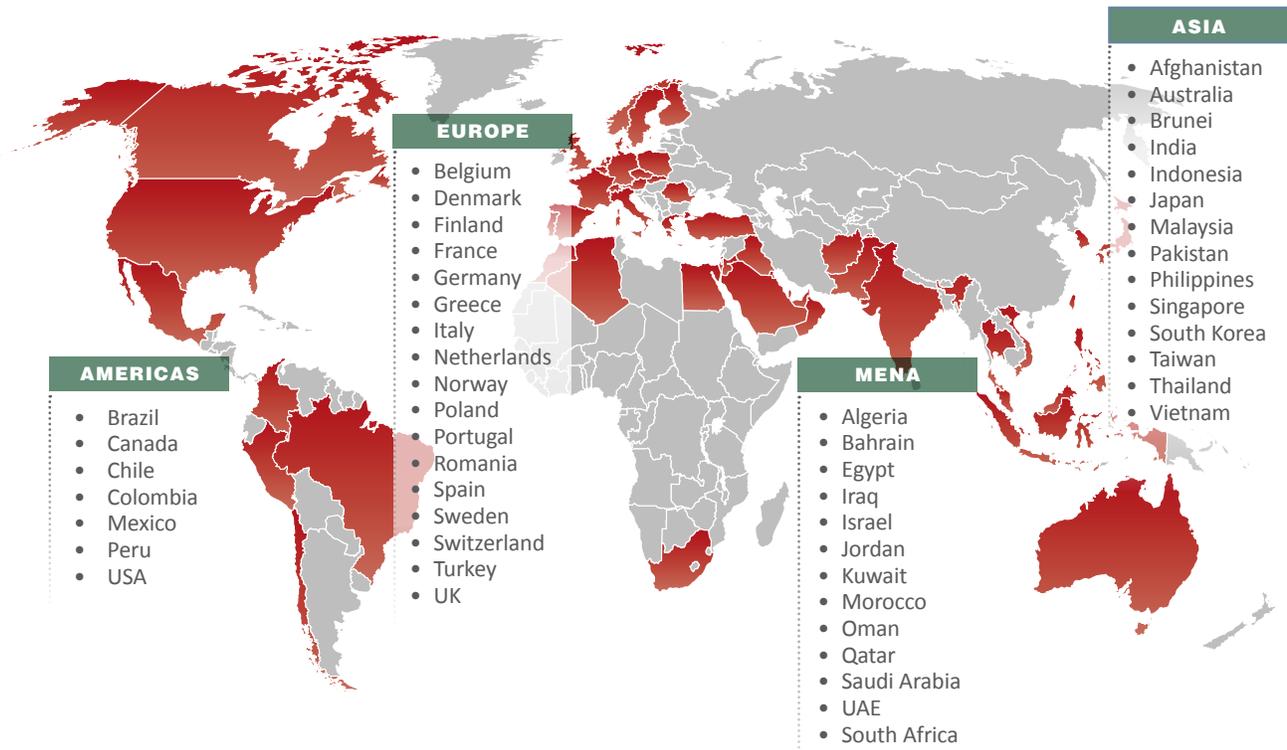
Emerging non-Western suppliers have been steadily expanding their presence in many markets, as defined by both geography and technical categories. Bolstered by an accumulation of technical expertise and intellectual property, more and more countries have the ability to not only serve their own defense requirements, but also to compete for global export opportunities. In many cases, these emerging players developed through diffused technology via prior export arrangements with Western suppliers, often through offsets requirements and domestic industry participation. The maturation and proliferation of these industries in the global defense marketplace will inevitably “squeeze” Western defense manufacturers over the next 10 years.

China and Russia increasingly serve markets that Western nations regarded as fenced off by Cold War-era U.S. or European political relationships. This dynamic is influenced by many factors, including the increasing political influence that China brings to bear, the increasing capability of Chinese and Russian products relative to Western counterparts, and a perceived loss of international influence by the United States.

Moving forward, the effect of these dynamics will vary by product sector and geography. But on the whole, U.S. and European defense companies can expect

a more crowded marketplace. In an increasing number of countries, there will be a growing presumption of high-value domestic industrial content, regardless of whether a domestic or foreign supplier provides the winning solution. And more suppliers will be in position to offer a mix of technical performance, competitive price, and economic value.

**Figure 1: Avascent Analytics Global Platforms and Systems Database International Coverage 2016**



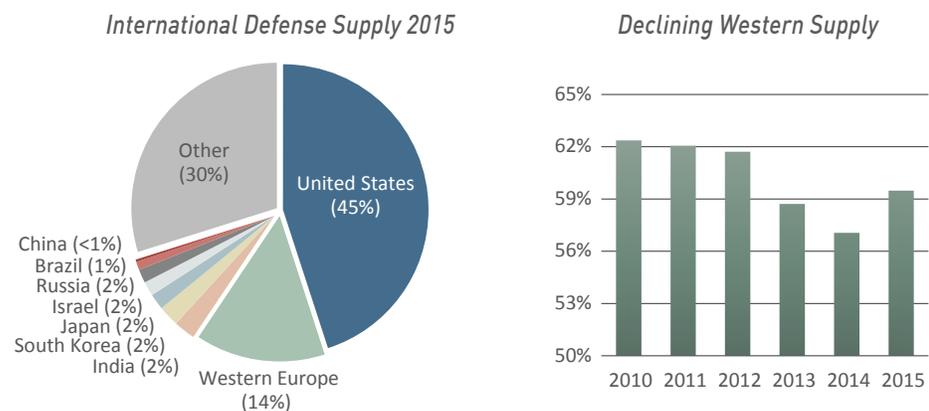
Avascent Analytics analyzes the defense spending of 55 countries in its Global Platforms and Systems (GPS) database. GPS itemizes and forecasts over 95 percent of international defense investment spending accessible to Western defense suppliers. The database is composed of ongoing programs, announced competitions and planned future acquisitions, as well as Avascent Analytics' projections of future requirements. Projections are based on both top-down and bottom-up analysis that considers multiple factors, including economic indicators, threat perceptions, mission area gaps, historical investment behavior, industrial base and political considerations.

## Today's Global Defense Trade Landscape

For decades, a handful of countries dominated the global defense market. Companies in the United States, Europe, Russia, China, and a few other countries with strong internal demand traditionally accounted for most of the world's export value. Among the 55 countries that Avascent covers in its Global Platforms and Systems (GPS) database, Avascent estimates that the role of the United States and European suppliers is even more significant. The global pecking order, by and large, favored Western – and particularly American – defense suppliers.

**Figure 2: International Defense Suppliers**

*In 2015 Western suppliers accounted for 59 percent of all West-accessible defense spending. However, the supply of defense systems manufactured by Western suppliers has steadily declined since 2010, as more countries purchase from non-Western suppliers.*

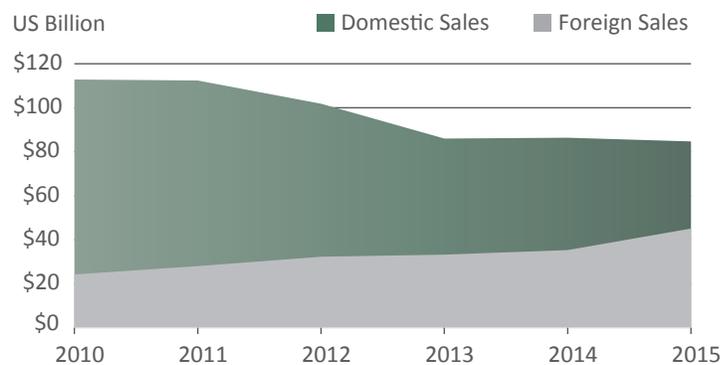


Historically, U.S. companies dominated Europe, the Middle East, Asia/Pacific, and other major arms-importing regions of the world. This dominance came from technical superiority and the incentive of stronger political or economic relations with the United States. Consistently high investment budgets and lessons learned from extended combat deployments, along with significant economies of scale, gave U.S. suppliers several decades of advantage in a number of defense product categories. Additionally, allied countries frequently chose to fulfill their military requirements by purchasing American products in an effort to strengthen strategic bonds with the U.S. government. The allure of closer ties to Washington, both during the Cold War and in the years since the collapse of the Soviet Union, could even be more important than the operational value of some systems.

Since U.S. defense investment peaked in 2010, many American defense companies pursued an explicit strategy of growing their global market position as a means of offsetting home market risk. Avascent Analytics' data suggests that, by and large, American suppliers successfully responded to a decline in domestic demand with robust foreign sales over the past five years. Foreign sales have partially offset the decline in domestic demand since 2010, when only 17 percent of defense equipment manufactured in the United States was exported; by 2015, that number jumped dramatically to 34 percent.

**Figure 3: Sales from American Defense Suppliers**

*Foreign sales of American-manufactured defense equipment rose from USD 24.2 billion in 2010 to USD 45.1 billion in 2015, while domestic sales declined from USD 112.8 billion in 2010 to USD 84.7 billion in 2015.*



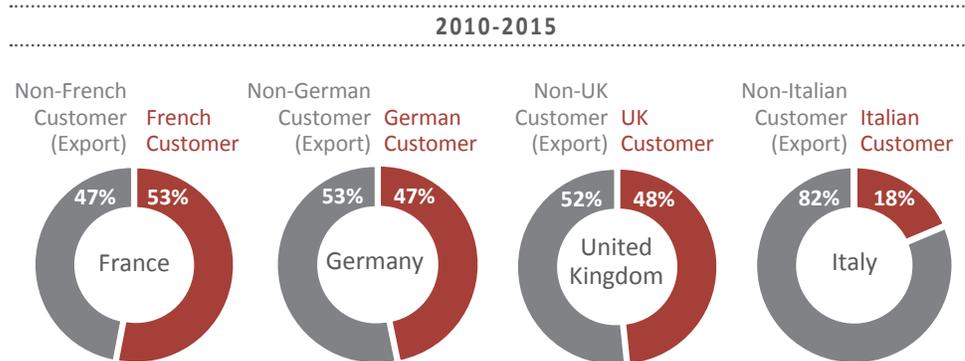
Firms based in the UK, France, Germany, and Italy also have been major players in the international defense market space. Indeed, over the past several years, recessionary pressures, fiscal austerity, a weak euro, decline in domestic defense spending, and more concerted efforts from national governments to promote local industry abroad motivated European suppliers to strongly pursue exports. While sales to Western European customers dropped at an average of six percent per year since 2010, many European companies fared relatively well abroad.

Overall, Europe's defense industry depends heavily on foreign sales (Figure 4). European military aircraft producers have recently gained notable success in the international arena, following a long period of U.S. dominance. In the maritime domain, major domestic fleet recapitalization programs boosted the largest shipbuilders on the continent, though non-European demand also rose over the past five years. Nearly all of Europe's largest ground vehicle producers relied on

sales to non-European end-users. Avascent Analytics expects these trends to persist in the coming decade.

**Figure 4: Export-Dependent European Suppliers**

*Europe’s biggest defense manufacturers rely significantly on exports beyond the region. Companies based in the four countries represented in this figure generally sold more to international customers than home-based customers.*



The Russian and Chinese defense industries can be counted among the largest in the world. However, they primarily attained this position on the basis of domestic demand, along with sales to a relatively narrower array of countries. While both Moscow and Beijing committed significant amounts of money on defense modernization over the past several years, they lagged behind their Western counterparts in technical sophistication, at least until recently.<sup>2</sup>

China’s defense industry targets what U.S. defense contractors might regard as “non-traditional” customers – nations whose buying power is tightly constrained and/or who have a much more limited record of acquiring high-end defense systems. Indeed, of the 55 countries represented in Avascent’s GPS database, only Pakistan emerges as a substantial buyer of Chinese exports. Beijing’s high-profile sales to Islamabad include the JF-17 Thunder and Yuan-class Type 041 diesel-electric submarine (currently China’s biggest-ever defense export deal). As rising political tensions between Pakistan and United States fuel a budding relationship of strategic convenience between Pakistan and China, Avascent expects China to eclipse the United States as the South Asian country’s largest arms provider as early as this year, in 2016.

Beyond Pakistan, the Chinese defense industry occasionally supplied accessible clients in the Middle East and Southeast Asia, with systems ranging in complexity

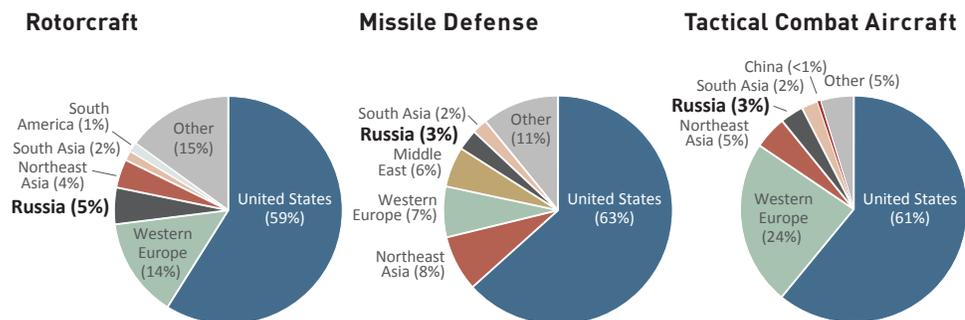
from ammunition and ordnance to low-end aircraft and unmanned systems. The most significant of these deals include trainer aircraft to Egypt (in 2007) and unmanned aerial vehicles to Thailand (in 2012). But until recently, Chinese defense exports mainly went to nations to whom U.S. and other Western firms are legally barred from selling or otherwise regard as marginal customers. Indeed, Chinese exporters' biggest markets have been in Bangladesh, Myanmar, Nigeria, Tanzania, and Venezuela. The prospective lifting of the United Nations arms embargo on Iran following the 2015 nuclear deal also figures to revive the Iran-China defense trade, another market off limits to Western defense suppliers.

Russia's defense industry historically enjoyed a longer track record of exports than China, extending beyond the former Soviet Union and Warsaw Pact states. Like China, however, Russia cannot easily import advanced defense technology from the West. Like China, Russia cannot easily import advanced defense technology from the West. Thus, sustaining R&D in new equipment designs remains an imperative for Moscow, even as economic sanctions and low oil prices stretch the government's resources. This has the effect of keeping Russian firms relevant across a relatively wide array of products with export potential. And with low oil and other commodity prices, defense sales represent some of the most important export opportunities for the Russian economy.

Over the past five years, Russian exports found success with a wide variety of "tier-two" markets with looser political, economic or military ties to Western nations. Russian defense manufacturers conducted business with 18 countries

**Figure 5: Russia's Accessible Market Share**

*Russian manufacturers are present in many West-accessible markets, although their share of the markets are often minimal. The graphs below depict the proportion of military hardware produced by each country or region.*



out of the 55 countries covered in the GPS database. Since 2010, 11 countries (Poland, Peru, Pakistan, Mexico, Iraq, Indonesia, India, Hungary, Egypt, Brazil, and Afghanistan) purchased Mi-series rotorcraft from Russian Helicopters. Three countries (Iraq, India, and Algeria) acquired fighter aircraft from Russian sources. Nine countries bought anti-tank missiles or anti-ship missiles (Brahmos, Konkurs, and Kh-series). And five countries agreed to procure Russia's S-300 or Pantsyr-class missile defense systems.

However, the overall volume of sales of Russian equipment remains well below Western defense deals. For example, Russian rotorcraft sales accounted for just five percent of total helicopter sales in West-accessible defense markets in any given year between 2010 and 2015. By comparison, American manufacturers accounted for between 45 percent and 60 percent during the same period. Similarly, Russian fighter aircraft sales remained below five percent of total sales to accessible markets since 2010, compared to American suppliers' 60 to 65 percent.

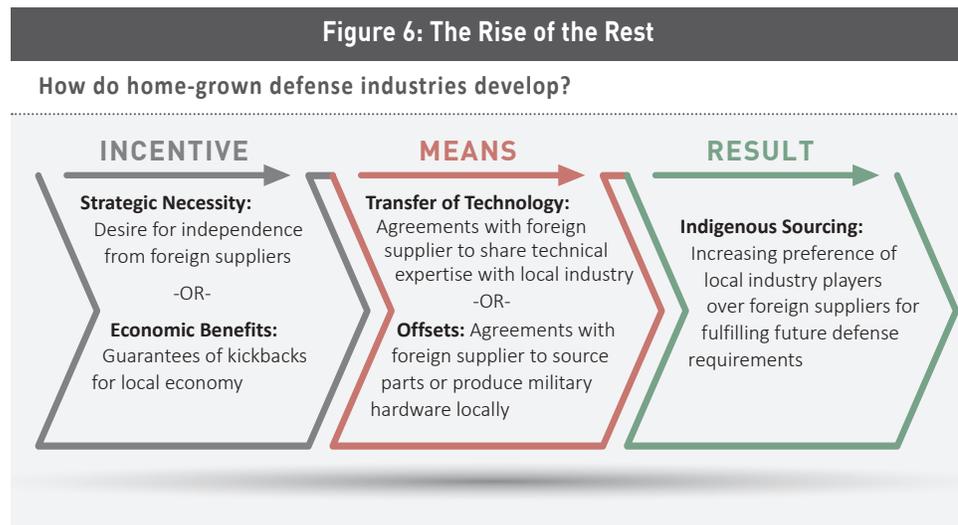
The West's traditional advantages, however, may not last. Avascent Analytics anticipates the global defense trade landscape to change markedly during the next 10 years. The analysis that follows examines the rising challenge to traditional Western suppliers in export markets. It examines several developments that threaten to undermine the longstanding primacy of U.S. and European suppliers in many advanced markets. Using data drawn from the GPS database, this paper details the current competitive landscape and course of profound change in the global defense market.

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## The 'Rise of the Rest' in the Global Defense Market

In 2008, Fareed Zakaria argued that perceptions of U.S. decline had more to do with the economic rise of other countries relative to their historical positions, rather than with problems within the United States itself.<sup>3</sup> Thus, the "rise of the rest" made it *feel* that the United States was falling behind, since the latter had always acted from a position of dominance. That observation holds true in the context of the global defense marketplace.

The growing trend of homegrown defense industries is behind much of the competitive change in the international defense market. Many countries desire indigenous defense industries on strategic or economic grounds, or both. They have often nurtured these nascent industries through political protection and stringent offset requirements in deals involving foreign suppliers, often absorbing these suppliers' technical expertise in the process. Over time, these protectionist



measures allowed the host countries to source increasingly from domestic producers rather than foreign ones, thus “crowding out” many legacy players in that particular market. Several of these industries have since even become competitive against Western exports in other markets, a trend expected to be reinforced over the next 10 years. This section explores these dynamics in detail and their implications for Western defense manufacturers in the coming decade.

### Strategic and Economic Imperatives

The desire for strategic self-sufficiency is often the primary motivation for developing indigenous defense industries. States like Israel and Taiwan, which face existential threats and uncertainty about their ability to access the global defense supply chain in times of crisis, see the development of domestic defense industries as a primary strategic imperative.

But there is more than strategic military rationale behind the burgeoning domestic defense industrial capacity. Economics matters enormously. The expenditure of large sums of public resources on military hardware is frequently linked with a parallel desire to see long-term economic benefits from that defense investment. Hence, more recently, the development of domestic industries has emerged as a more “discretionary” goal.

This is clearly the motivation behind Saudi Arabia’s announcement in April 2016 that it intends eventually to source as much as half of the Kingdom’s defense procurement needs from domestic suppliers. For Saudi Arabia, the new policy would take advantage of large public expenditures for national defense and gain

underlying strategic advantages – in this case, economic development and new sources of employment base in a post-petroleum society. But even countries with less stark demographic and economic challenges frequently aim for economic benefits from defense investments. Among Western countries, Canada provides a poignant example. Ottawa assesses not only technical solutions and price, but also an economic “value proposition” when it reviews defense contractor bids.

### **Technology Transfer and the Rise of the Rest**

How have countries spawned indigenous defense industries? Much of it can be attributed to stringent industrial offset and technology transfer policies. Many emerging defense firms now making a mark in the international defense marketplace can trace their heritage to key roles on American, European, and Russian export programs. For a growing number of nations, a central condition for their acquisition of foreign defense hardware is technology transfer and other assistance to local firms.

For decades, the United States led the global defense marketplace by selling to allied countries variants of platforms and equipment operated by the U.S. armed forces. These iconic “reference products” became synonymous with both U.S. military power and America’s defense alliances. Programs like the F-15 and F-16 fighter aircraft, Abrams tank, and Aegis naval combat system (among many, many others) both led U.S. defense exports and filled out the inventories of U.S. allies in Europe, Asia, and the Middle East.

These exports, however, also provided critical support to defense industrial capabilities in many countries. The F-16 is a useful case in point: many countries did not just acquire the aircraft, they also insisted as a condition for the sale that their domestic industries play a substantial role in the supply chain, final assembly work, or product sustainment activity.

Some key regional examples of technology transfers exist as well. Turkey undertook final assembly of their F-16s in 2013, becoming just one of five countries that builds parts of their own F-16s locally (along with Belgium, the Netherlands, South Korea and the United States). Israel experimented with some aircraft design and production, but abandoned that path under pressure from the U.S. government. As a result, Israel opted to import U.S. aircraft with Foreign Military Financing (FMF), while focusing their domestic industry in such areas as electronics, missiles, and UAS. Indeed, the Israelis have fully exploited their ability to supply major components to complex platforms by replacing significant

portions of their “imported” aircraft with locally produced systems. South Korea and Japan have taken a broader approach, developing and producing a wide variety of systems on a range of military platforms not limited to the aviation sector.

Western firms are not the only ones experiencing this pressure for technology transfer. Sharing technology is also the price of doing business for Russian and Chinese defense suppliers. India’s state-owned Hindustan Aeronautics Ltd. (HAL), for example, owes much of its capacity and capabilities to a series of partnerships with Russian aircraft suppliers. Similarly, Pakistan Aeronautical Complex (PAC) has longstanding ties to Chinese aviation enterprises, including Chengdu Aircraft Corporation (CAC).<sup>4</sup> The two companies have cooperated since the 1990s on the JF-17 fighter aircraft, among several other sophisticated defense systems.

### **Increasing Indigenous Sourcing**

The championing of domestic industry and a higher emphasis on offsets and technology transfers has led to a growing number of countries that turn increasingly to domestic sources. This, in turn, limits the addressable market for Western suppliers in a greater number of countries. Additionally, domestic sourcing also reinforces host governments’ desire to place even more stringent technology sharing and work-share conditions on import deals. While many nations host nascent defense industries capable of producing small arms, ammunition, and some ground combat equipment, the emergence of more sophisticated defense industries will over time threaten to crowd “foreign” suppliers out of previously accessible markets.

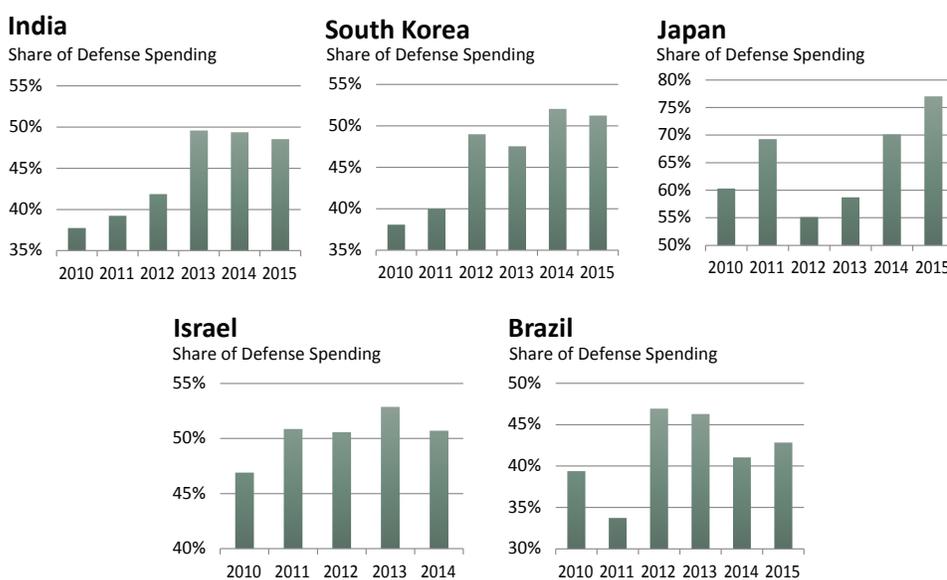
For example, from 2010 to 2015, the Indian defense industry expanded nine percent per year, spurred by double-digit per-annum defense budget growth rates (albeit somewhat neutralized by similarly high rates of inflation). Political initiatives aimed at boosting indigenous defense production, including the recently inaugurated “Make in India” family of policies, earmarked a significant majority of spending for domestic industry. The result is a steady and unambiguous increase in the volume of Indian acquisitions sourced from local suppliers, rising to over 50 percent of annual defense spending over the past five years.<sup>5</sup>

Likewise, South Korea’s armed forces increased the proportion of locally sourced acquisitions from under 40 percent in 2010 to more than 50 percent in 2015. The Japanese Self-Defense Forces, already heavily reliant on domestic industry (often produced under license from American designs), also boosted the volume of equipment purchased from local suppliers from 60 percent in 2010 to over 70 percent in 2015. While the Israel Defense Force and Brazilian armed forces

maintained 40 percent indigenous content since 2010, other regions of the world witnessed rapid growth in local content. In Southeast Asia, a region known for its import of American defense wares, Indonesia and Singapore launched strong initiatives over the past five years to indigenize defense manufacturing. Avascent Analytics expects defense imports in the region to further decline over the next 10 years.

**Figure 7: Rising Indigenization**

*Increasing domestic share of defense spending: The defense industries of India, South Korea, Japan, Israel, and Brazil are supplying an increasing proportion of defense equipment to their domestic customers, gradually taking away market share from Western suppliers in each of those markets.*



**Rising Players, Global Prospects**

The global prospects of these emerging defense industries vary. Though there are fewer constitutional limits to defense exports, the Japanese defense industry faces a difficult task of becoming globally competitive in the near future, as few Japanese-manufactured defense products can rival international offers in terms of quality and price. Additionally, high levels of political and social stigma among the Japanese citizenry still inhibit foreign sales of defense equipment – a trend likely to persist through the foreseeable future. The largest Japanese defense manufacturers will continue emphasizing commercial activity at the expense of defense-related sales, which historically constituted less than 10 percent of total corporate revenues. Because of domestic sensitivities to defense

exports, Japanese companies will be reluctant to initiate business development opportunities abroad without government encouragement.

A shift in Japanese corporate culture and in industry relations with government will be required before Japan can successfully compete in defense export markets. Indeed, short of significant revisions to industrial participation requirements, changes in cultural attitudes toward defense exports, and a willingness on the part of the Japanese government to enter risk-sharing agreements, Japanese defense manufacturers will likely not pursue global competitiveness for its defense products or the development of cutting-edge defense-related technologies. Amid modest efforts to enter foreign defense markets and international partnership agreements, most Japanese defense firms will likely not go much further beyond the current model, which emphasizes license production and assembly of foreign-designed defense systems.<sup>6</sup> Prime Minister Shinzo Abe has personally tried to jump-start Japanese defense exports by pitching the US-2 seaplane to India and the Soryu diesel-electric attack submarine to Australia.<sup>7</sup> Both initiatives failed, albeit for different reasons. It is unlikely that Abe's successor will risk as much political capital as he has for defense exports. After two high-profile setbacks, Japan's choice is to retreat from its efforts or double down.

Likewise, despite the considerable political effort expended to boost indigenous production capacity, the Indian defense industry will likely not become globally competitive in the near- to mid-term. The Indian government's policies favor state-owned defense manufacturers, and this stance will likely persist despite attempts to build up private-sector participation in Indian defense production. The absence of a viable aerospace sector in India, dominated by HAL, provides a particularly telling example.

HAL's virtual monopolization of all major domestic airborne programs has prevented other aircraft manufacturers from maturing. The Bangalore-based company controls the Light Combat Aircraft (LCS-Tejas) program, Su-30MKI license-production agreements and sustainment expertise, the joint Indo-Russian partnership on the Multi-Role Tanker Transport (MRTT) and Fifth-Generation Fighter Aircraft (FGFA) programs, and the Light Utility Helicopter (LUH) and Light Combat Helicopter (LCH) programs, among many other marquee projects. The private Indian company Tata Sons Ltd. won a contract with Airbus Group to produce 56 medium-range transport aircraft to replace the aging fleet of Avros in the Indian Air Force (IAF) in November 2015. But beyond the Avro program, the Indian government has generally stunted the development of a domestically

**Figure 8: Global Prospects**

*Israel's UAV, missiles, and sensors producers have become established fixtures in the global defense marketplace over the past decade. Avascent Analytics expects South Korea's naval platform and lower-end tactical combat aircraft sectors to expand their global footprint in the coming decade, followed by Brazil's special mission aircraft sector.*

COUNTRY	 Israel	 South Korea	 Brazil
EXPORT STRENGTHS	  	  	

and internationally competitive aerospace industry by favoring HAL. HAL's chronic production backlogs and delivery delays exacerbate this predicament and illustrate the obstacles that will likely hold back the Indian defense industry from becoming an export juggernaut unless major changes occur.

On the other hand, Avascent Analytics expects the defense industries of South Korea, Israel, and Brazil will emerge as more significant exporters over the next 10 years. In time, they will be capable of competing directly with longstanding suppliers. Israel's defense electronics systems, precision munitions, and UAS sectors in particular feature globally established, industry-leading firms.<sup>8</sup> A substantial allotment of U.S. FMF credits and associated access to a wide array of American defense products (particularly platforms) prompted Israeli industrial policymakers to concentrate political support on developing those niche markets. The result has been a burgeoning international clientele across the globe.

Israel exported one-third to one-half of total defense industrial production over the past five years.<sup>9</sup> The destinations varied widely, including India (currently

Israel's largest export market) and the United States (where many Israeli firms have entered into co-production or partial-ownership agreements). Israeli defense suppliers also concluded a healthy array of deals with various European, South American, and Southeast Asian customers; the Heron and Hermes UAVs in particular found significant traction among international customers (including South Korea, Germany, Canada, and Australia). Avascent Analytics anticipates continued Israeli success in the sensor (radar), missile, and remotely-piloted system markets over the next decade.

South Korea's defense industry focuses predominantly on domestic customers, but current trends (and an increasingly loud chorus of political directives) indicate serious export ambitions. Aircraft manufacturer Korea Aerospace International (KAI) experienced modest export success via its T-50 trainer aircraft and F/A-50 light attack variant, with Indonesia, Iraq, Peru, and the Philippines among launch customers. Its partnership with Indonesian industry for the Korean Fighter Experimental (KF-X) program will also be one to watch, as the South Koreans attempt to propel their aerospace industry into the advanced multi-role fighter aircraft market.

Likewise, South Korea's shipbuilding industry – whose commercial business is already the largest in the world – has also been making inroads into major accessible defense markets over the past five years. Exports to date have largely been limited to small surface vessels and logistics and other support vessels. However, South Korea's ability to domestically produce advanced destroyers, frigates, amphibious assault vessels, and attack submarines will provide significant export opportunities over the next 10 years; indeed, South Korea exported its first submarine in March 2016 to Indonesia, with two more on order. South Korea holds an advantage when it comes to other Asian exporters: it faces fewer export restrictions compared to Japan and lower political obstacles compared to China. Southeast Asia in particular may source increasingly from South Korean suppliers, diminishing the available opportunities for European and American defense suppliers.

Brazil's defense industry will likely lag behind that of Israel and South Korea – a task made more challenging by its aspirations to enter a saturated missionized aircraft market. Nevertheless, Embraer's entry into niche regional and lower-tier markets with light attack aircraft, light transport aircraft, and low-end ISR and maritime patrol aircraft will allow it to compete in a modest manner over the next 10 years. Moreover, its partnership with Saab in the co-production of the Gripen fighter ensures an industrial connection to Western markets into the future.

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## Prospects for a Changing Landscape

The increasing prominence of non-traditional players in the global defense market is due to a wide array of factors, some of which have been in the making for many years. But a series of developments set in motion during the past decade will accelerate – and complicate – this trend.

### The Effect of Export Control on the Competitive Field

Western suppliers long avoided serving markets subject to technology transfer controls. In an environment of increasingly capable defense industrial bases around the world, however, a decision by Western countries to avoid selling certain kinds of technology risks ceding the competitive field to new players. To be sure, the United States always implemented stringent export control policies, as has Western Europe (as is notably the case with Sweden and, more recently, Germany), driven often by political rather than industrial considerations. But what is new and different today is the availability of suitable alternatives from unconstrained global competitors.

Whereas the F-16 was symbolic of a prior era in the global defense market, the F-35 Joint Strike Fighter symbolizes an increasingly common dynamic today. The F-16 was exported far and wide, often with substantial industrial participation by the importing country. The U.S. Department of Defense and F-35 prime contractor Lockheed Martin also established an ambitious export agenda for this newer aircraft. Indeed, a group of nine founding partner countries form a core group for industrial participation on the program. Beyond the partner nations that gain particular industrial benefits from cooperating on the design phase, however, the U.S. government restricts where the F-35 can be sold. So far, just three other non-partner countries have both the money and the technology transfer permission to acquire the F-35. This leaves a void that other exporters hope to fill.

For example, the United States will avoid exporting the F-35 to Israel's immediate neighbors in order to safeguard Israel's qualitative military advantage. This leaves a gap in the Middle East market – a region that collectively spent \$13.5 billion on combat aircraft since 2010 and is projected to spend an additional \$30.5 billion through 2020 – that other aircraft manufacturers are filling. Eurofighter's Typhoon, Dassault's Rafale, and Boeing's F-15 Eagle have all secured sales to countries that might have preferred the fifth-generation F-35. Eurofighter gained customers in Saudi Arabia (2006) and Kuwait (2016), while Rafale made its first export sales to Qatar (2011) and Egypt (2014). Boeing extended the F-15 Eagle franchise with the sale of a heavily modified variant, the F-15SA, to Saudi Arabia beginning in 2012, but delayed since.

Multinational agreements largely complied by Western countries also provide an opening for companies from non-signatory countries to fill the void. The area of unmanned aerial systems represents a case in point. Under the Missile Technology Control Regime (MTCR), 34 signatory countries refrain from transferring military drones capable of delivering weapons that weigh more than 500 kilograms with ranges exceeding 300 kilometers.<sup>10</sup> This agreement continues to limit exports from a number of leading Western suppliers of UAS systems. Indeed, some companies went so far as to redesign their products to avoid being subject to the MTCR. But in the absence of the most established companies, other suppliers emerged. As noted previously, Israel Aerospace Industries and other Israeli firms (e.g., Heron, Hermes, Searcher) have carved out substantial market positions in Europe, Asia and elsewhere.<sup>11</sup>

Chinese firms are also moving into this space. Saudi Arabia, UAE, Iraq, and Egypt – all traditional buyers of U.S. and European defense hardware – are reported to have acquired the Caihong family of medium-altitude/long-endurance UAS from China's Chengdu Aircraft Design and Research Institute. Several of these buyers have operated the CH-4 in an armed configuration. Though the CH-3 and CH-4 models lack the range, capability, and sophistication of U.S. drones, China's willingness to sell them abroad further illustrates the reality of an expanding market that will be eagerly filled by non-Western competitors. This will especially hold true among customers that do not require the most advanced, high-end UAS solutions as provided by the United States, but seek cost-competitive, low- and mid-tier offerings from elsewhere.

Companies in the U.S. satellite industry have argued for some time that U.S. ITAR restrictions effectively fence off large portions of the global commercial satellite market. While the United States does not completely ban sales of commercial satellites and recent export control reforms attempt to address industry concerns, restrictions on U.S.-sourced satellite components and technologies severely limits U.S. firms. This effectively opens up large portions of the global satellite market to foreign competitors.

As U.S. and European governments control the export of other sensitive technologies – like cyber and electronic warfare capabilities – the competitive field for non-traditional players will be less crowded. Russian, Chinese, and Israeli suppliers may thus find a less competitive field. And as countries gain greater military capabilities from non-Western sources, the ability of Western governments to exert control over their allies' military activities will decline, facilitating the encroachment of Chinese, South Korean, Israeli, and other

companies into these emerging technology markets. A qualitative gap will certainly still remain between Western and non-Western hardware, but the number and quality of alternate “good enough” options available to countries excluded by U.S. and select European export controls will continue to expand.

### **Western Product Offerings and International Demand: Divergence for the U.S.**

This section specifically addresses a unique challenge facing U.S. defense suppliers. In many sectors, U.S. companies export the world’s premier defense technologies. The broad spectrum of military capabilities fielded by U.S. forces, and the high degree of R&D that the U.S. Department of Defense invests in serves to ensure U.S. companies’ competitiveness in most areas of the global marketplace.

However, there are notable “holes” in the U.S. export portfolio, and the coming wave of investment priorities could exacerbate this situation. In certain sectors, U.S. firms long sat out many global markets. For example, domestic shipbuilders have specialized in the construction of larger surface combatants given the U.S. Navy’s evolution into a predominantly cruiser- and destroyer-based force. However, the significant majority of international fleets concentrate their forces primarily around smaller multi-purpose frigates and corvettes. As a result, U.S. shipbuilders rarely serve overseas markets. Lockheed Martin appears set to export a variant of its *Freedom*-class Littoral Combat Ship, itself an imported design, to the Royal Saudi Navy. Yet this is an exception to a broader trend of U.S. absence as a prime contractor in the global market for surface combatants.<sup>12</sup> Avascent projects that demand for maritime capabilities will grow sharply in the coming 10 years, driven mainly by Middle Eastern and Asian customers. In the Middle East, this represents a cyclical shift from an aviation-led modernization phase to one focused on naval systems. This dynamic has the potential to cause a notable shift in global market share relationships in the coming decade, with U.S. suppliers set to lose out. In the area of diesel-electric submarines, which Avascent Analytics projects will grow to a per-annum USD \$10.7 billion market by 2025, U.S. shipyards also lack exportable designs as the U.S. Navy emphasizes nuclear powered vessels.

By contrast, European firms, with frigate-focused home customers, generally led the way in the global market for surface combatants and submarines. European firms TKMS, DCNS, Blohm & Voss, Navantia, Fincantieri, and Damen account for a far larger portion of sales to customers inclined to buy imported solutions than do their U.S. counterparts. Russia also enjoyed notable export success with both submarines and small surface combatants, while South Korea’s shipbuilding

sector is poised for a big breakout in the global defense maritime market over the next 10 years.

In other areas, too, the product mix offered by U.S. firms reveals key gaps. Small transport aircraft represent a niche area that U.S. companies have largely overlooked due to their core customers' preference for larger aircraft. Spanish, Italian, and other designs therefore dominate the global market in this category. Indeed, Brazil's Embraer recently raised the stakes in this segment with its dual-engine KC-390 aircraft program that targets domestic and international markets. The United States itself may need to tap the global defense marketplace in the coming years to fill its requirement for a new jet trainer. Most of the existing designs that the U.S. prime contractors might adapt for the U.S. Air Force T-X program are foreign designs, such as KAI's TA-50, BAE Systems' Hawk, and Finmeccanica/Leonardo's M346.

Furthermore, the U.S. Defense Department is poised to enter an extended period of investment in strategic nuclear forces modernization. Programs like the Ohio-class replacement submarine, the B-21 long-range strike bomber (LRS-B), the Long-Range Stand-off (LRSO) cruise missile, the Ground-Based Strategic Deterrent (a replacement for the venerable Minuteman intercontinental ballistic missile), and other classified programs will consume a substantial share of DoD RDT&E resources in the coming years – over \$16.5 billion through 2020, and \$52.5 billion through 2025. These types of systems have minimal export potential, apart from some cooperative activities with the United Kingdom.

### **Decline in the Political Advantage of the West**

In September 2013, the government of Turkey announced its intention to acquire the HQ-9 air and missile defense system from China Precision Machinery Import Export Corp (CPMIEC) for USD \$3.4 billion. The decision by a NATO ally to acquire a high-end military system from China shocked Turkey's allies, and Western competitors Raytheon and Eurosam in particular. Ankara's decision to acquire the so-called T-LORAMIDS system was widely seen as a manifestation of Turkish President Recep Tayyip Erdogan's increasing displeasure with the nation's traditional NATO allies.

This development raised issues beyond the loss of a valuable export contract. NATO governments expressed concerns about integrating a Chinese system with the alliance air defense and command and control systems. Ultimately, heavy political pressure led Ankara to cancel the deal in November 2015. But

the episode challenged presumptions about the importance of traditional military industrial and political ties in defense transactions.

For many countries that rely on imported defense technology, diversifying one's supplier base has several advantages. The buyer can bargain for better terms (e.g., price, technology transfer) by playing multiple suppliers against one another. The customer can maintain political and military relationships with more than one country. And the importer may simply believe that access to superior technology requires buying from multiple countries. But there is no doubt that U.S. (and, to a lesser extent, European) sources are going through a sea of change in the global defense market.

The decade following the end of the Cold War appeared to strongly favor Western defense exporters. With Russia prostrate and China still rising, the West's political influence towered above other nations. With the dominant display of U.S. military force in the first Iraq War and in the Balkans through the 1990s, the United States set the standard for military – and defense industrial – power at the end of the 20<sup>th</sup> Century.

Yet developments during the past decade raise questions about the relative role of the United States to other countries' foreign (and, therefore, defense procurement) policies. Embroilment in protracted conflicts in the Middle East, a profoundly shaken economy stemming from the worst financial crisis in nearly a century, and the emergence of other poles of power around the world visibly undermined American political clout overseas. More recently, the 2014 nuclear agreement with Iran further complicated this picture, driving a wedge between Washington and allies in Riyadh, Abu Dhabi, and other Gulf States that look on Teheran with trepidation. The U.S. approach to the civil war in Syria, where the Obama Administration has sought to minimize direct U.S. military involvement even as it pushes regional allies to engage more directly, also served to weaken trust in Washington. All of these events may directly and indirectly lead some countries in the region to look beyond American defense suppliers.

It is noteworthy that recent sales of Eurofighter Typhoon and Rafale fighters occurred in Middle Eastern states with legacies of acquiring U.S. equipment. The Eurofighter Typhoon gained customers in Saudi Arabia (2006) and Kuwait (2016), while Rafale made its first export sales to Qatar (2011) and Egypt (2014).

Yet Western European countries have also been losing political ground in the international arena as well. Indeed, while it may be argued that the decline in

American influence around the world is temporary and addressable, the erosion of European political clout in the international arena appears to be fundamental and enduring. Steady declines in defense spending over the past decade and the absence of cohesive continent-wide security and foreign strategies undermine Europe's ability to wield decisive political authority in the most significant international matters. As operations in Libya and Syria reinforced, European militaries also appear incapable of undertaking major military campaigns without the assistance of U.S. forces.

Changes to the European defense industrial landscape that otherwise promise to boost the continent's standing in international defense markets could be threatened by this political decline. A series of mergers and acquisitions point toward an inexorable trend of consolidation. For example, major multi-national conglomerates have formed over the past 10 years in the aviation sector, including the Airbus Group and Finmeccanica/Leonardo, among others. The European ground combat sector is presently undergoing such transformation with the formation of KMW and Nexter Together (KANT) in December 2015 as the latest example. The maritime sector will likely follow within the next 10 years. The rationale for such consolidation is strong: pool the considerable, yet highly dispersed, expertise available in each sector into unified entities capable of competing at the highest level and in the biggest markets. Yet the political "downgrade" of European nations could still stifle their ability to sell systems overseas, particularly in competitions against large influential players such as the United States, Russia, and (perhaps) China. U.S.-based defense suppliers already report "feeling" the recent decline in Washington's political clout abroad, which raises questions about the further impact of waning influence on foreign governments' defense procurement plans. The effect of Europe's mergers and acquisitions could also be undermined by the continent's decline in influence abroad.

The T-LORAMIDS episode points to another post-Cold War dynamic that has the potential to reshuffle the global defense marketplace: China's emergence. To date, Chinese defense exporters served only a small number of the largest countries that comprise Western defense firms' primary export markets. However, China will inevitably grow its presence in the global defense markets in the coming decade, particularly among countries without allegiance to the United States or Western Europe. Over the long term, China's economic influence could have a gravitational effect, drawing countries closer to its political and diplomatic orbit. And while these ties may not be as deep or formal or as Western nations enjoyed, they may be sufficient to disrupt longstanding defense supplier relationships.

Chinese defense manufacturers may not become a regular fixture in competitions for high-end, high-profile platforms involving Western defense suppliers in the near future. But they will certainly evolve into a much greater presence in markets that require lower-cost, “good enough” solutions.

China’s recent economic success is having an effect on another key variable affecting the global defense trade: R&D. Chinese investment in military modernization is yielding an increasingly broad arsenal of equipment being offered for sale on the global market. As we have seen, Chinese fighter aircraft, unmanned aerial systems, and air defense systems have begun to make their mark among nations that U.S. and European firms formerly saw as leaning toward Western suppliers. Again, the gulf in quality between Chinese- and Western-manufactured systems suggests that the former will not become imminently competitive in the highest echelons of the global defense trade. Nonetheless, China’s avid commitment to defense R&D and an expanding pool of intellectual property (thanks in part to a state-sanctioned industrial espionage program) will make its firms increasingly active players in the international defense marketplace over the next 10 years. In particular, China will invest and develop – and then export – capabilities that may provide asymmetric advantage over the United States and other Western nations.

For Russian defense suppliers, an increasingly confrontational foreign policy combined with a commitment to defense R&D presages potential export success. Of particular importance was the successful use of advanced equipment by Russian military forces in Crimea, Ukraine, and Syria. Russian forces have effectively demonstrated such capabilities as unmanned ISR, electronic attack, long-range land-attack cruise missiles, precision-guided ground-attack munitions, and others. Though U.S. forces demonstrated these capabilities over 20 years ago, their proliferation over the past five years will further shape the global defense market by raising the bar for what is accessible from more permissive non-Western sources.

To be certain, the decline in oil and other commodity prices, combined with broader economic problems, will limit Russian government spending, and thus the pace of military technical innovation. But the need for hard currency may drive Russia to vigorously pursue defense exports. With continued investment, operational innovation, and historically lower prices compared to Western alternatives, Russian defense equipment will pose consistent, if not formidable, competition to Western suppliers in the coming decade.

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## Conclusion

Western defense companies need to carefully consider these broader emerging dynamics when evaluating individual markets and opportunities. While U.S. and European domestic defense budgets show signs of growth, there is no doubt that export markets will continue to provide substantial – and highly contested – opportunities.

The increasing “diffusion” of the global defense marketplace presents competitors with an array of questions to resolve if they are to enhance or even simply preserve their international positions. The process of finding, prioritizing, shaping and bidding on new opportunities – already an extremely complex and expensive proposition – will get increasingly difficult. Specifically, four questions arise from the observations presented in this paper:

**Political:** Competitors must recalibrate their overall sense of market access based on shifting political-military relationships. As the Turkey LORAMIDS episode and other recent Middle Eastern acquisitions demonstrate, traditional alliances and historical bilateral ties no longer guarantee the outcome of international military competitions. Western exporters must carefully weigh the domestic and international impact on a customer government’s national security and defense industrial policies. Among the key questions: Where are long-standing U.S. or Western ties fraying? What are the domestic and international political tradeoffs driving acquisition decisions?

**Economic:** The nexus of global economics and the international defense market cannot be overlooked. For example, if oil prices continue to stagnate, how should competitors expect the behavior and preferences of petro-states to shift? Will they increasingly favor lower-cost solutions? Will they make technology transfer and domestic industrial participation a more important source selection criterion than operational capability? If the euro remains weak for an extended period of time, will European exporters gain a structural advantage, compared to their U.S. competitors? Likewise, will China’s commitment to defense R&D suffer if its economy experiences stagnation or recession, or will Beijing redouble its investment in the sector to spur exports?

**Competitive:** Newly capable defense suppliers will bring to bear particular sets of technical competencies, political advantages, and competitive tendencies. Where and how will firms from Israel, South Korea, Singapore, Turkey, and other countries act in the marketplace? In which market sectors will they seek opportunities? What kinds of technology transfer and industrial partnership arrangements will they be able to establish, and where?

**Industrial:** Capitalizing on future international opportunities will require a different set of tactics from the past, as well as more diverse global supply chains than what Western defense manufacturers traditionally worked with. While “simple exports” involving no meaningful technology transfer are an exception today, the degree of technology sharing and workshare split will increasingly be weighted toward helping the buyer’s domestic industry. Structuring bids and proposed transactions will require greater creativity and a deeper understanding of the local industrial context as part of broader regional and global market considerations.

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## Methodology



Avascent Analytics analyzes the defense spending of 55 countries in its Global Platforms and Systems (GPS) database. The GPS database covers approximately 95 percent of international defense investment spending that is accessible to Western defense suppliers (referred to in this paper as “accessible markets”). The database features a comprehensive “topline” forecast of each country’s total defense spending over a 10-year period, as well as a detailed “bottom-up” analysis of its program-by-program plans.

A unique feature of our database, Avascent Analytics breaks down total defense spending figures for each country into five sub-accounts based on the nature of spending activity: procurement, research and development (R&D), personnel, operations and maintenance (O&M), and pensions. The bottom-up component of the database itemizes the procurement and R&D budgets among an array of individual program plans. These include ongoing programs, announced competitions and planned future acquisitions, as well as Avascent Analytics’ projections of future requirements over the next 10 years, in an effort to depict how each country will spend its investment resources over time. Projections are based on multiple factors, including threat perception, mission area gaps, historical investment behavior, industrial base capacity, and other political considerations. Each program or platform acquisition is subsequently disaggregated into its component parts to provide sub-system granularity.

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## Methodology Cont'd

It should be noted that Russia, China, and Iran are not considered accessible markets for Western suppliers. Consequently, these countries are not covered as *customers* of defense equipment in the GPS database. However, the GPS database *does* closely track Chinese- and Russian-origin *suppliers* whenever they provide defense equipment to any one of the 55 countries of interest.

For this analysis, each program in the GPS database was assigned a “source country” based on the location of the headquarters of the prime contractor. For the sake of methodological simplicity, the entire value of a program was attributed to the country in which the prime contractor is located. Complex defense systems increasingly involve multiple contractors that span multiple countries, particularly given more complex and stringent offset requirements and co-production regulations. While the GPS database does capture contractor data at the systems and sub-systems levels, we analyze trends at the platform- and prime contractor-level. It should also be noted that this analysis also primarily examines supplier trends based on defense investment (procurement and R&D) spending. Services and other maintenance-related activities are not included in this analysis, although Avascent Analytics also covers these segments.

Finally, this analysis contrasts “Western” defense suppliers with “non-Western” or “non-traditional” defense suppliers (used interchangeably). The former refers to defense manufacturers headquartered either in the United States or Western Europe, and the latter to companies headquartered elsewhere. A country can both be labeled as an “accessible” market to Western defense suppliers *and* a non-Western defense supplier. Such countries as South Korea, India, and Brazil would fit in that category – as countries whose armed forces can be customers to American or European defense companies, but whose domestic defense industries are considered non-Western. China and Russia are also considered “non-Western” sources (although not “accessible”).

## Endnotes

- 1 Avascent Analytics defines “accessible” markets mainly as those to which Western suppliers are permitted to export. Avascent Analytics has focused its analysis on 55 of the largest spending countries in this “accessible” sphere in the Global Platforms and Systems (GPS) database. Refer to the methodology section for more details.
- 2 Because Russia and China are generally inaccessible markets for Western defense suppliers, Avascent does not cover either country as a customer of defense equipment in the GPS database. The same is true of Iran, North Korea, and other countries with notable levels of defense spending. However, Avascent Analytics’ GPS database does closely track Chinese- and Russian-origin suppliers whenever they provide defense equipment to any one of the 55 countries of interest.
- 3 Zakaria, Fareed, “The Post American World,” (New York: W.W. Norton & Company, Inc.), 2008.
- 4 China, of course, also owes much of its technical expertise in many defense sectors to Soviet and Russian tutelage – expertise gained through both formal, official knowledge-sharing arrangements as well as less open channels.
- 5 Though indigenous sourcing has clearly risen in India as a result of “Make in India”, the success of the policies in boosting India’s defense industry is questionable. The following section describes in greater detail the shortcomings of the policies and the prospects for India’s defense industry in the coming decade.
- 6 The notable exceptions to this have been the occasional government-to-government defense development program, which are politically enforced and incentivized agreements primarily with American defense suppliers. The most prominent example of such programs includes the joint development of the SM-3 Block IIA Standard Missile (between Raytheon and Mitsubishi Heavy Industries). Avascent Analytics believes, however, that such activities will remain the exception rather than the norm. Also worth mentioning is the recent failed attempt to bid competitively in Australia’s Collins-class attack submarine replacement program.
- 7 Japan’s recent attempt to bid competitively in Australia’s Collins-class attack submarine replacement program further illustrates how the decision to relax defense exports controls in the country remains a “top-down” phenomenon, introduced by political leadership, rather than a “bottom-up” one led by industry. Until recently (when Malcolm Turnbull became prime minister of Australia, specifically), the Japanese Soryu-class submarine offering was viewed as the leading contender in the program. Most industry analysts, however, attribute this to the particularly close relationship between Prime Ministers Tony Abbott and Shinzo Abe. Japanese defense officials and industry leaders, on the other hand, are reported to have displayed lukewarm enthusiasm toward the process. Together with the risks surrounding Japan’s inexperience in defense exports and concerted publicity campaigns from the other two competitors (France-based DCNS and Germany-based HDW), the attractiveness of the Japanese bid waned once the personal relationship between the two premiers gave way.
- 8 Exports of platforms and higher-end systems, including the Iron Dome and David’s Sling air and missile defense (AMD) systems, may also be possible over the next 10 years. However, the high degree of export-sensitive content in these systems and collaboration with American industry in developing them will likely limit the number of customers available for them. South Korea is the latest country known to have entertained Israeli AMD systems for the Korea Air and Missile Defense (KAMD) program, in which the US’ own Terminal High-Altitude Air Defense (THAAD) system was also considered.
- 9 Based on an analysis of publicly acknowledged export deals. The actual volume of Israeli defense exports is probably higher. Many Israeli defense manufacturers often conceal the identity of their customers when announcing export deals (e.g., “undisclosed Southeast Asian country”). On 25 November 2015, the Knesset rejected a bill that would have restricted defense exports to customers determined to have committed human rights violations, which suggests that the volume of Israeli defense exports will persist unhindered over the next five or 10 years.
- 10 The MTCR was originally drawn up specifically to control the transfer of ballistic and cruise missiles. Unmanned aerial systems fall into that category by default. Also, the MTCR does not completely prohibit, but severely restricts, the export of missiles, stating that such transfers should be sanctioned by critical-need exceptions only.

- 11 Israeli and American providers of unmanned aerial systems became strongly entrenched in European markets also predominantly because of a relative absence of domestic solutions – the consequence of a lack of a cohesive vision and public commitment to the sector, particularly in the medium-altitude/long-endurance (MALE) and high-altitude/long-endurance (HALE) domains. Europe primarily imports its UAS requirements from abroad as a result, and this trend is expected to prevail over the next 10 years.
- 12 Officially referred to as the “Multi-Mission Surface Combatant” program by the Royal Saudi Navy. This deal has not yet been concluded at the time this paper went to press. The proposed acquisition (of up to four “frigates” based on the United States Navy’s Littoral Combat Ship program) would represent the biggest and most ambitious component of the second Saudi Naval Expansion Plan (SNEP-II). The Royal Saudi Navy will likely increase the weapons load and install a new combat management system.

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### About Avascent

Avascent is the leading strategy and management consulting firm serving clients operating in government-driven markets. Working with corporate leaders and financial investors, Avascent delivers sophisticated, fact-based solutions in the areas of strategic growth, value capture, and mergers and acquisition support. With deep sector expertise, analytically rigorous consulting methodologies, and a uniquely flexible service model, Avascent provides clients with the insights and advice they need to succeed in dynamic customer environments.

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