

## IV. Arms production and military services

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### Overview of developments in the arms industry, 2016

Sales of arms and military services by the SIPRI Top 100—a ranking of the world’s largest arms-producing and military services companies (excluding China) according to arms sales—totalled almost \$375 billion in 2016, a 1.9 per cent increase compared with 2015 (see table 5.7).<sup>1</sup> This is the first year-on-year real-terms rise in Top 100 arms sales since they reached a peak of \$420 billion in 2010, which was followed by five consecutive years of decline. Despite the growth in 2016, the total arms sales of the Top 100 were still 13 per cent lower than those of 2010. However, they were 38 per cent higher than those of 2002, the year when SIPRI began reporting corporate arms sales.

The growth in the total arms sales of the Top 100 for 2016 was largely driven by a 4.0 per cent increase in the arms sales of companies based in the United States (see table 5.8). The USA has a decisive influence on the annual global trend in arms sales due to (a) the high number of US-based companies listed in the Top 100 (38 are ranked in 2016); and (b) the scale of the arms sales of the highest-ranked companies from the USA compared with companies from other countries (6 of the top 10 companies listed in 2016, including the top 3, are based in the USA). Arms sales by US-based companies accounted for 58 per cent of total arms sales by the Top 100 for 2016.

The annual trend in arms sales by the Top 100 is also heavily influenced by companies based in Western Europe. The combined arms sales of the 25 ranked West European companies amounted to \$91.6 billion in 2016, which accounted for 24 per cent of total sales by the Top 100. Companies from eight West European countries, as well as two entities categorized as ‘West European’, were ranked in 2016 (see table 5.8).<sup>2</sup> There were overall increases

<sup>1</sup> Companies included in the SIPRI Top 100 may change from year to year, especially those situated at lower ranks. Consequently, comparisons between total revenues do not necessarily include the same companies each year.

SIPRI estimates that several Chinese arms-producing companies are large enough to be ranked in the Top 100. However, due to a lack of comparable and sufficiently accurate data, it has not been possible to include them in the rankings.

‘Arms sales’ refers to sales of military equipment and services to armed forces and ministries of defence worldwide; sales are only for those companies that are ranked. Unless otherwise stated, all arms sales figures in this section are presented in nominal (current) US dollars, while percentage changes and shares are in constant 2016 US dollars (i.e. real terms). For further detail see the SIPRI Arms Industry Database, Dec. 2017. See also Fleurant, A. et al., ‘The SIPRI Top 100 arms-producing and military services companies, 2016’, SIPRI Fact Sheet, Dec. 2017.

<sup>2</sup> The category ‘West European’ refers to companies whose ownership and control structures are located in more than 1 European country. The West European companies listed in the Top 100 for 2016 are Airbus and MBDA.

**Table 5.7.** Trends in arms sales of companies in the SIPRI Top 100 arms-producing companies, 2007–16

Percentages above 10 per cent have been rounded to the nearest whole number, those below 10 per cent to 1 decimal place.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<i>Arms sales in current prices and exchange rates</i>										
Total (\$ b.)	349	392	406	420	420	405	406	397	370	375
Change (%)	11	12	3.4	3.6	0.0	-3.7	0.3	-2.1	-6.9	1.3
<i>Arms sales in constant (2016) prices and exchange rates</i>										
Total (\$ b.)	371	398	426	432	408	389	381	369	368	375
Change (%)	4.6	7.1	7.1	1.3	-5.4	-4.7	-2.2	-3.0	-0.4	1.9
Cumulative change since 2007 (%)	0	7.1	15	16	10	4.9	2.5	-0.6	-1.0	0.9

*Note:* Figures in this table refer to the companies in the SIPRI Top 100 for each year, which means they refer to a different set of companies each year, as ranked from a consistent set of data.

*Source:* SIPRI Arms Industry Database, Dec. 2017.

in the arms sales of companies based in Germany, Norway, Sweden, Switzerland and the United Kingdom. By contrast, there were overall decreases in the arms sales of the two West European entities and of companies based in France, Italy and Spain. Despite the diverging trends in Western Europe, the combined arms sales of companies based in that region remained stable in 2016, increasing by 0.2 per cent compared with 2015, mostly due to the growth in arms sales of British and German companies.

The combined arms sales of companies based in Russia rose by 3.8 per cent. This increase was mainly driven by domestic demand and by the implementation of a long-term and comprehensive modernization programme, which is intended to improve and update the capabilities of Russia's arms industry and allow it to reach higher standards in weapons performance. A total of 10 Russian companies appear in the Top 100 for 2016, 7 of which are in the top 50. No Russian company appears in the top 10, however.

SIPRI's 2016 ranking underlines the stability of the world's top arms-producing and military services companies. Several of the companies, such as Lockheed Martin, BAE Systems, Thales and Rheinmetall, listed in the first half of the ranking in 2016 have been listed in all previous years since 2002—the first year covered by the SIPRI Arms Industry Database. Major changes in rank in the upper half of the Top 100 tend to be caused primarily by mergers, acquisitions and divestments of companies that were ranked in previous years. By contrast, there is often more fluctuation from year to year in the rankings of companies in the lower half of the Top 100. This is mainly due to the fact that a year-on-year change in the total arms sales of a lower-ranked company (with smaller arms sales) will often have a comparatively larger impact on ranking than a change of the same value for a

higher-ranked company (with larger arms sales). The smaller the original arms sales total, the more important a change will be relative to that total.

*Three categories of arms producers: 'major', 'other established' and 'emerging'*

The USA, Canada, Russia and countries in Western Europe with arms-producing or military services companies ranked in the Top 100 are categorized by SIPRI as 'major arms producers', since these countries are widely acknowledged to have comprehensive arms-production capabilities. The 'other established producers' category includes countries that rank arms producers and military services companies in the Top 100 and have mature and, in many cases, significant arms-producing capabilities, but do not intend to develop their capabilities further. The countries in this category for 2016 are Australia, Israel, Japan, Poland, Singapore and Ukraine. The 'emerging producers' category includes countries with arms producers and military services companies that rank in the Top 100 and have stated objectives to build significant indigenous arms-production capabilities and achieve some greater level of self-sufficiency in arms procurement. The countries in this category for 2016 are Brazil, India, the Republic of Korea (South Korea) and Turkey.

Undoubtedly, these classifications are imperfect but, as an analytical tool, they can provide insights into trends and developments in arms-production capabilities, both within and across categories. Trends in 2016 and longer-term trends (between 2002 and 2016) in each category are discussed in more detail in the following subsections.

### **Major arms producers**

While the arms sales of major arms producers in the Top 100 increased by 35 per cent between 2002 and 2016, their share of total arms sales dropped by 3 percentage points (from 93 to 90 per cent) for the same period. In other words, the total arms sales of the Top 100 companies as a whole grew faster (by 39 per cent) between 2002 and 2016 than the overall arms sales of the major arms producers in the Top 100 over that period.<sup>3</sup> Fewer companies from major arms producers were ranked in 2016 (74 companies) than in 2002 (81 companies). In addition, the share of total Top 100 sales by the 10 largest arms producers (6 in the USA, 1 each in France, Italy and the UK and 1 West European entity) decreased from 60 per cent in 2002 to 52 per cent in 2016. This suggests that the arms industry is becoming slightly less concentrated, with the largest companies now holding a smaller proportion of the Top 100 market share.

<sup>3</sup> Note that the companies included in the SIPRI Top 100 change from year to year.

**Table 5.8.** Regional and national shares of arms sales for the SIPRI Top 100 arms-producing companies in the world excluding China, 2016 compared with 2015<sup>a</sup>

Percentages above 10 per cent have been rounded to the nearest whole number, those below 10 per cent to 1 decimal place.

Number of companies	Region/country <sup>b</sup>	Arms sales (\$ b.)		Changes in arms sales, 2016–15 (%)		Share of total Top 100 arms sales, 2016 (%)
		2016	2015 <sup>c</sup>	Nominal <sup>d</sup>	Real <sup>e</sup>	
<b>39</b>	<b>North America</b>	<b>218</b>	<b>207</b>	<b>5.3</b>	<b>4.0</b>	<b>58</b>
38	United States	217	206	5.3	4.0	58
1	Canada	0.8	0.8	2.6	4.8	0.2
<b>25</b>	<b>Western Europe</b>	<b>91.6</b>	<b>95.9</b>	<b>-4.5</b>	<b>0.2</b>	<b>24</b>
8	United Kingdom	36.1	39.8	-9.2	2.0	9.6
6	France	18.6	18.7	-0.9	-0.8	5.0
2	West European <sup>f</sup>	15.8	16	-1.5	-1.6	4.2
2	Italy	10.1	10.8	-6.5	-6.1	2.7
3	Germany	6.0	5.6	6.8	6.6	1.6
1	Sweden	2.8	2.6	4.9	5.5	0.7
1	Switzerland	0.8	0.8	0.0	2.8	0.2
1	Norway	0.7	0.7	5.5	6.1	0.2
1	Spain	0.7	0.7	-4.1	-3.6	0.2
<b>10</b>	<b>Eastern Europe</b>	<b>26.6</b>	<b>26.3</b>	<b>1.0</b>	<b>3.8</b>	<b>7.1</b>
10	Russia	26.6	26.3	1.0	3.8	7.1
<b>12</b>	<b>Other established producers</b>	<b>20.9</b>	<b>20.3</b>	<b>2.8</b>	<b>-1.2</b>	<b>5.6</b>
5	Japan	8.2	7.9	4.1	-6.4	2.2
3	Israel	7.8	7.7	1.6	0.9	2.1
1	Singapore	1.7	1.7	1.8	2.8	0.5
1	Poland	1.1	1.2	-4.2	0.8	0.3
1	Ukraine	1.1	0.9	22	25	0.3
1	Australia	0.9	1.0	-4.1	-4.3	0.3
<b>14</b>	<b>Emerging producers</b>	<b>17.8</b>	<b>16</b>	<b>12</b>	<b>12</b>	<b>4.7</b>
7	South Korea	8.4	7.0	19	21	2.2
4	India	6.2	6.2	-1.0	-1.2	1.6
2	Turkey	2.3	1.9	24	28	0.6
1	Brazil	0.9	0.8	15	11	0.2
<b>100</b>	<b>Total</b>	<b>375</b>	<b>366</b>	<b>2.5</b>	<b>3.1</b>	<b>100</b>

Note: Arms sales figures are in US\$ b., at current prices and exchange rates. Figures do not always add up to stated totals due to the conventions of rounding.

<sup>a</sup> Although it is known that several Chinese arms-producing enterprises are large enough to rank among the SIPRI Top 100, a lack of comparable and accurate data makes it impossible to include them.

<sup>b</sup> Figures for a country or region refer to the arms sales of the Top 100 companies headquartered in that country or region, including those in its foreign subsidiaries. They do not reflect the sales of arms actually produced in that country or region.

<sup>c</sup> Arms sales figures for 2015 refer to companies in the SIPRI Top 100 for 2015, and not to the companies in the Top 100 for 2016. Figures are given in current (2016) prices and exchange rates.

<sup>d</sup> This column gives the change in sales 2016–15 in current US dollars.

<sup>e</sup> This column gives the change in sales 2016–15 in constant (2016) dollars.

<sup>f</sup> The 2 companies classified as ‘West European’ are Airbus and MBDA.

Source: SIPRI Arms Industry Database, Dec. 2017.

### *United States*

US-based companies benefit from the largest domestic demand in the world and also capture a significant share of the international market for arms and military services (see section I). For 2016, US weapons procurement funding was just under \$103 billion and research, development, testing and evaluation was \$64.9 billion.<sup>4</sup> Moreover, the USA’s enduring defence posture and foreign policy, which seek to preserve US primacy in world affairs, necessitate maintaining large, technologically advanced and comprehensive national arms-production capabilities.<sup>5</sup>

Since SIPRI started collecting data on the global arms industry, the yearly trend in total Top 100 arms sales has invariably been set by US-based companies, and 2016 was no exception. The combined sales of the 38 US-based companies in the Top 100 amounted to \$217 billion in 2016, accounting for 58 per cent of the Top 100 total. Lockheed Martin, the world’s largest arms producer, increased its arms sales by 11 per cent in 2016 to reach \$40.8 billion, significantly widening the gap between it and Boeing, the second largest arms producer. Growth in Lockheed Martin’s arms revenues was expected following the acquisition of helicopter manufacturer Sikorsky from United Technologies in 2015 and increased deliveries of F-35 combat aircraft.

Several key developments in the USA in 2017 are likely to shape the annual trend in the total value of arms sales for the Top 100 in 2017. In his first budget request to the US Congress following his inauguration in 2017, US President Donald J. Trump committed to continue implementation of a programme to modernize the country’s military nuclear capabilities that was initiated under the previous administration. The cost of this programme is estimated by the US Congressional Budget Office (CBO) to be \$1.2 trillion over a period of 30 years.<sup>6</sup> Notably, although the CBO estimate accounts for inflation, other estimates forecast that the total cost will be closer to \$1.7 trillion.<sup>7</sup> As the modernization programme includes major systems, such as intercontinental ballistic missiles, nuclear-powered ballistic missile submarines

<sup>4</sup> US Department of Defense (DOD), Office of the Under Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 2018 (Revised)* (DOD: Washington, DC, Aug. 2017). On the international arms trade see section I above; and the SIPRI Arms Transfers Database.

<sup>5</sup> O’Hanlon, M., *The National Security Industrial Base: A Crucial Aspect of the United States, Whose Future May Be in Jeopardy*, 21st Century Defense Initiative Policy Paper (Brookings: Washington, DC, Feb. 2011).

<sup>6</sup> US Congressional Budget Office (CBO), *Approaches for Managing the Costs of US Nuclear Forces, 2017–2046* (CBO: Washington, DC, Oct. 2017).

<sup>7</sup> Reif, K., ‘Trump continues Obama nuclear funding’, *Arms Control Today*, July/Aug. 2017; and Reif, K., ‘CBO: nuclear arsenal to cost \$1.2 trillion’, *Arms Control Today*, Dec. 2017.

and nuclear-capable long-range bombers, US-based arms producers stand to benefit significantly.<sup>8</sup> However, a cut to US Government tax revenues implemented at the end of 2017 may place additional constraints on the US military budget and undermine the USA's capacity to implement this and other (non-nuclear) military modernization programmes.<sup>9</sup> In addition, the spending limitations on the US Government budget imposed by the 2011 Budget Control Act, which remained in place in 2017, will continue to have an impact on the arms sales of US-based companies.<sup>10</sup>

### *Western Europe*

The collective arms sales of companies based in Western Europe amounted to \$91.6 billion in 2016. Overall sales in the region remained stable compared with 2015. However, while the ranking hierarchy of the largest West European arms-producing companies in the Top 100 does not change significantly from year to year, the overall arms sales totals of the companies in each West European country tend to follow different trajectories because the European market and industry remain fragmented by national borders.

With arms sales of \$36.1 billion in 2016, the eight British companies ranked in the Top 100 accounted for 9.6 per cent of the Top 100 total and the largest proportion of the West European total. The combined arms sales of British companies grew by 2.0 per cent compared with 2015. BAE Systems, the UK's largest arms producer, increased its sales by 0.4 per cent, while arms sales by Rolls-Royce, the UK's second largest arms producer, rose by 4.5 per cent. GKN, an aerospace components manufacturer, recorded the highest growth in arms sales (43 per cent) among British companies between 2015 and 2016. The short-term outlook for British arms manufacturers remains uncertain following the UK's decision in 2016 to leave the European Union (EU).

The combined arms sales of the six French companies ranked in the Top 100 amounted to \$18.6 billion, accounting for 5.0 per cent of the overall total for 2016. This represents a decrease in sales of 0.8 per cent compared with 2015. The slight fall was mostly due to a slowdown in deliveries of Rafale combat aircraft (produced by Dassault) compared with 2015. Dassault's arms sales decreased by 25 per cent in 2016. The arms sales of land systems producer Nexter also fell, by 19 per cent.

<sup>8</sup> On US nuclear force modernization plans see chapter 6, section I, in this volume.

<sup>9</sup> Goodkind, N., 'Republican tax bill could hurt US military, according to top generals', *Newsweek*, 12 Dec. 2017; and Gould, J., 'US defense industry to Congress: don't let tax cuts add to the deficit', *Defense News*, 28 Oct. 2017.

<sup>10</sup> Budget Control Act of 2011, US Public Law no. 112-25, signed into law 2 Aug. 2011. See also Sköns, E. and Perlo-Freeman, S., 'The United States' military spending and the 2011 budget crisis', *SIPRI Yearbook 2012*, pp. 162–66. On the spending limitations on the US budget see also chapter 4, section I, in this volume.

Following a corporate restructuring, Italy's largest arms producer, Finmeccanica, was renamed Leonardo in 2016.<sup>11</sup> The company's subsidiaries (such as AgustaWestland) were all consolidated into the parent company, except for the US-based Leonardo DRS. The company also sold its civilian transportation business and will now chiefly focus its activities on aerospace and military capabilities. Leonardo's arms sales were \$8.5 billion in 2016—a decrease of 8.5 per cent compared with 2015. The arms sales of Italy's second largest arms producer, the naval shipyard Fincantieri, totalled \$1.6 billion in 2016, representing an increase of 7.1 per cent. This was due to deliveries of littoral combat ships to the USA and of frigates and submarines to Italy.

The combined arms sales of the three German companies listed in the Top 100 for 2016 rose by 6.6 per cent to \$6.0 billion. The arms sales of land systems producers Krauss-Maffei Wegmann and Rheinmetall each rose by 13 per cent due to increased German arms procurement. By contrast, ThyssenKrupp's sales fell by 6.6 per cent.

Two companies are categorized as 'West European': MBDA (France, Italy and the UK) and Airbus Group (Germany, Spain and the UK). MBDA was formerly categorized as a subsidiary of Airbus but is listed as an independent company in the Top 100 for 2016.<sup>12</sup> Its arms sales grew by 3.1 per cent to \$3.3 billion in 2016. The arms sales of Airbus Group, which is ranked in the top 10 for 2016, totalled \$12.5 billion—a decrease of 2.7 per cent compared with 2015. The fall is partly due to delays in delivering the A400 military transport aircraft.

One enduring issue for West European arms-producing countries is the sustainability of their arms-production capabilities as national resources are stretched and the costs of planned new generations of weapons are high. Attempts to generate greater trans-European cooperation and create European arms companies have been limited.<sup>13</sup> In 2017, following announcements of new and continuing arms modernization plans by the USA and Russia, the EU launched a programme to create better conditions for cooperation in arms production among EU member states, called Permanent Structured Cooperation (PESCO). Under the programme, the EU has, for the first time, allocated research and development funds that are specifically dedicated

<sup>11</sup> Leonardo, 'Finmeccanica: shareholders' meeting approves the change of the company's name and the 2015 financial statements', Press release, 28 Apr. 2016.

<sup>12</sup> Following a reassessment of MBDA, its status has been changed from 'joint venture' to 'company'. Its new status is reflected in adjustments for arms sales of the SIPRI Top 100 for previous years.

<sup>13</sup> An example would be the union between armoured vehicles manufacturers KMW (Germany) and Nexter (France). In 2016, sales were still made by the individual companies as the combination of the 2 companies, called KNDS, was still a holding company. Reuters, 'KMW and Nexter complete Franco-German tank deal', 5 Dec. 2015.

to the arms industry.<sup>14</sup> Access to funding is conditional on the submission of cross-border cooperation projects, the objective being to create larger, trans-European arms producers.

### *Russia*

With 10 companies ranked in the Top 100 for 2016, Russia's share of total Top 100 arms sales was 7.1 per cent. The combined arms sales of Russian companies increased by 3.8 per cent in 2016, reaching a total of \$26.6 billion. However, this rate of increase is lower than it was between 2014 and 2015. The central drivers of this deceleration are constraints on public finances and the effects of EU and US sanctions, which have limited Russian companies' access to some components and subsystems, causing delays in production and delivery of weapons. In 2016 Russia's gross domestic product dropped by 3.7 per cent following the fall in oil and gas prices and the implementation of sanctions.<sup>15</sup>

The Russian state armament programme (gosudarstvennaya programma vooruzheniya, GPV) for the period 2011–20 ended in December 2017.<sup>16</sup> The new GPV is intended to cover 2018–27 and includes a \$283 billion (19 trillion rouble) fund for procurement and \$14.9 billion (1 trillion roubles) for infrastructure construction.<sup>17</sup> According to reports, the GPV for 2018–27 aims to provide Russia with new generations of major weapon systems, such as hypersonic weapons, latest-generation combat aircraft (and their engines) and a modernized nuclear arsenal.<sup>18</sup> Precision-guided weapons and air defence systems have also been prioritized by the Russian Ministry of Defence.<sup>19</sup> However, doubts have been expressed regarding Russia's capacity to conduct modernization programmes, especially for new generations of weapons, within the existing budgetary constraints, assuming that sanctions remain in place and there is no significant increase in oil and gas prices.<sup>20</sup>

<sup>14</sup> European External Action Service, 'Permanent Structured Cooperation (PESCO): deepening defence cooperation among EU member states', Fact Sheet, 5 Mar. 2018.

<sup>15</sup> Luhn, A., 'Russia's GDP falls 3.7% as sanctions and low oil prices take effect', *The Guardian*, 25 Jan. 2016; and Aksenov, P., 'Ukraine crisis: why a lack of parts has hamstrung Russia's military', *BBC News*, 8 Aug. 2015.

<sup>16</sup> Mills, C., 'Russia's rearmament programme', House of Commons Library, Briefing Paper no. 877, 24 Jan. 2017.

<sup>17</sup> Russian Ministry of Defence, 'New 2018–2027 state armaments programme stipulates first-ever fund allocations for infrastructure construction', 10 Jan. 2018.

<sup>18</sup> Gorenburg, D., 'Russia's military modernization plans: 2018–2027', Ponars Eurasia, Policy Memo no. 495 (Nov. 2017).

<sup>19</sup> Boulègue, M., 'Russia's new state armament programme offers a glimpse at military priorities', Chatham House, Expert Comment, 27 Nov. 2017.

<sup>20</sup> Wezeman, S. T., 'China, Russia, and the shifting landscape of arms sales', SIPRI Commentary, 5 July 2017.



### **Other established producers**

The general approach taken by countries in the established producers category is based on a policy of selective support of national arms-production capabilities. Each country's policy also reflects its own national preferences, funding priorities and budgetary constraints. The country in this category with the highest number of companies ranked in the Top 100 for 2016 was Japan with five, followed by Israel with three. Australia, Poland, Singapore and Ukraine each had one company ranked in the Top 100 for 2016. The combined arms sales of companies in this category fell by 1.2 per cent in 2016 to a total of \$20.9 billion. However, only companies based in Japan (-6.4 per cent) and the Australian company (-4.3 per cent) recorded overall decreases in arms sales.

The other established producers category is heavily influenced by trends in Japan due to the number of Japanese companies ranked and their comparatively high volume of arms sales. The fall in Japan's arms sales in 2016 was driven by a decline in the sales of its largest arms companies: Mitsubishi Heavy Industries (-4.8 per cent), Kawasaki Heavy Industries (-16 per cent) and Mitsubishi Electric Corporation (-29 per cent). The decline is partially attributable to the appreciation of the yen against the US dollar, leading to a reduction in orders.

The arms sales of the Ukrainian company UkrOboronProm rose by 25 per cent in 2016. This was mainly due to high local demand caused by the ongoing conflict in eastern Ukraine, its absorption of the aircraft producer Antonov in 2016, and arms exports.

In the longer-term trends, the arms sales of other established producers in the Top 100 rose by 44 per cent between 2002 and 2016, slightly outpacing the overall arms sales growth (39 per cent) of the Top 100 for that period. As a result, there was a minor increase in these producers' share of total Top 100 arms sales over that period: their share rose from 5.4 per cent in 2002 to 5.6 per cent in 2016. There were two fewer companies in this category ranked in 2016 than in 2002.

### **Emerging producers**

The country in the emerging producers category with the highest number of companies ranked in the Top 100 for 2016 was South Korea with seven companies, followed by India (four companies), Turkey (two companies) and Brazil (one company). For some of these countries, such as Turkey and South Korea, there were some successes in export markets (see section I).<sup>21</sup> The

<sup>21</sup> For further detail see the SIPRI Arms Transfers Database.

combined arms sales of companies in this category increased by 12 per cent in 2016 to a total of \$17.8 billion.

South Korean arms producers heavily influence annual developments in the emerging producers category. Their combined arms sales totalled \$8.4 billion in 2016, representing a 21 per cent increase compared with 2015 and a 430 per cent increase since 2002. South Korean arms producers held a 2.2 per cent share of total Top 100 sales in 2016, putting South Korea alongside countries in the other established producers category such as Israel and Japan. The arms sales of Brazilian and Turkish companies also increased in 2016, growing by 11 and 28 per cent, respectively. India was the only emerging producer whose Top 100 companies had lower arms sales (-1.2 per cent) in 2016.

The longer-term trends show that emerging producers' overall share of total Top 100 arm sales grew from 2.1 per cent in 2002 to 4.7 per cent in 2016. The rise in the emerging producers' share of the Top 100 arms sales appears to correlate with the previously discussed fall in the major arms producers' share during the period. There were also more companies in the Top 100 for 2016 from countries classified as emerging producers (14 companies) than in 2002 (5 companies).

### **Drivers of arms sales**

Identifying specific drivers behind changes at category and country levels is problematic due to methodological limitations in Top 100 data. However, some general observations can be made. The first and most significant driver of arms sales is the strength of domestic demand in the country in which a company is based. This is true for all companies included in the Top 100, but is especially clear in countries in which the arms industry has been growing rapidly, such as South Korea. Other central drivers are cycles of weapon modernization, tensions and conflict, which increase national demand for arms. In terms of cycles of modernization, some major arms producers are planning multiple and costly new weapon programmes, including nuclear modernization programmes, which have either started or will begin soon. This is the case, notably, for the USA, Russia and France. In general, there is a delay between a country announcing the procurement of new generations of weapons and a corresponding increase in arms sales for the companies involved, as these programmes take time to materialize, often spanning decades. However, if the planned programmes are implemented in these countries, they will have a notable effect on the Top 100 ranking in the coming years.

Regional tensions and wars may partially explain why Top 100 arms sales rose in the 2000s and peaked in 2010, with demand led by members of the North Atlantic Treaty Organization (NATO) and countries involved in the

wars in Afghanistan and Iraq. This driver is also often the catalyst for a country to implement comprehensive military industrialization programmes. Indeed, procurement funding to support military industrialization is probably one of the principal factors behind the rise in emerging producers' arms sales, as military industrialization projects usually involve significant research and development and procurement resources. Other key drivers of change in arms sales from year to year are mergers, acquisitions and divestments, each of which may either increase or decrease individual company's arms sales and a country's (or region's) overall share of Top 100 arms sales.