



Lessons from around the world:

Benchmarking performance in defense

A first-of-its-kind benchmarking effort compares the productivity and performance of defense ministries across the globe, helping them pinpoint areas of inefficiency and identify the highest-potential opportunities.

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With wars under way in several parts of the globe and many countries' defense budgets suffering drastic cuts, defense ministries are under pressure to do more without spending more. And most defense ministries recognize that they have ample room to improve both the efficiency and effectiveness of their operations. Yet a typical defense ministry has little perspective on what constitutes best practice in defense operations, where its biggest opportunities for saving money or boosting productivity lie, or how it stacks up against its counterparts in other countries in the core areas of defense.

Some would argue that comparing the performance of one defense department to another's is neither achievable nor instructive, given that

countries are in very different political situations and have different priorities and military strategies. Granted, many variables affect the performance of a country's armed forces, and it would be virtually impossible to account for all the complexities and dynamics that come into play. Furthermore, defense ministries make deliberate trade-offs—for example, choosing to pay more for domestically manufactured equipment. That said, defense departments everywhere engage in the same types of operational activities. Our firm belief is that certain aspects of operational performance are indeed comparable across ministries of defense, and that ministries can learn from one another when it comes to delivering more defense output for the same or less input.



In 2008 and 2009, we undertook a first-of-its-kind benchmarking effort—one that compares the performance and productivity of defense ministries worldwide. We gathered and analyzed data from 33 countries that account for more than 90 percent of global defense spending, developing a benchmark that we believe yields valuable insights into where and how ministries of defense can become more effective while reducing or maintaining costs. In the simplest terms, the exercise involved analyzing a discrete set of quantitative inputs—namely, publicly available data on the quantity and type of military equipment, number and general classification of personnel, and annual defense budgets disaggregated into key spending categories—and converting them into a set of ratios that measure outputs in three core budget areas of defense: personnel, equipment procurement, and maintenance. Assembling inputs presented a significant research challenge due to wide variability in the quality and quantity of available data, but defining the inputs was reason-

ably straightforward; defining and measuring outputs, on the other hand, was a much more complex undertaking (see sidebar, “Our methodology for calculating output,” p. 8).

Our benchmarking results show wide variability across countries in each ratio (Exhibit 1). Once a country has selected a peer group against which to compare itself, it can use these benchmarks to help pinpoint areas of inefficiency and zero in on the highest-potential opportunities. For the purposes of this benchmarking exercise, we used five straightforward country categories based on types of military strategies: global-force projection (countries with worldwide striking capability), small-force projection (NATO members or countries with a fairly significant presence in international missions), relevant national security threat (countries under attack or threat), emerging regional powers, and non-aligned or neutral countries. This simplified peer-group categorization was adequate for our initial purposes, but to

Exhibit 1 Stacking up

Benchmarking showed wide variations in performance.

Budget area (average % of defense budget)	Key ratios	Range	Average
1 Personnel (45%)	<ul style="list-style-type: none"> • “Tooth to tail” (combat personnel as % of total personnel) • Number of deployed as % of total active troops • Personnel costs per active and other personnel • Personnel costs over military equipment output¹ 	<ul style="list-style-type: none"> 16–54% 1–18% \$800–\$146,000 \$2,000–\$218,000 	<ul style="list-style-type: none"> 26% 5.3% \$44,800 \$72,000
2 Equipment procurement (18%)	<ul style="list-style-type: none"> • Military equipment output¹ over procurement and R&D spending (index) • Procurement spending over active troops 	<ul style="list-style-type: none"> 17–330 \$1,000–\$536,000 	<ul style="list-style-type: none"> 100 \$60,000
3 Maintenance (8%)	<ul style="list-style-type: none"> • Cost of maintenance per unit of military equipment output¹ • Cost of maintenance over cost of equipment procurement 	<ul style="list-style-type: none"> \$2,000–\$104,000 8.2–446% 	<ul style="list-style-type: none"> \$13,000 13%

¹One unit of military equipment output is approximately equivalent to one combat-ready unit (eg, a manned and maintained combat vehicle). For more, read “Our methodology for calculating output,” p. 8.

generate the most useful insights from the benchmarks, a defense ministry must thoughtfully and carefully select a peer group based on its military strategy.

One particularly interesting finding was the variability among countries in the level of joint spending, which ranges from almost 70 percent to 3 percent (Exhibit 2). Not surprisingly, we found that countries that share more functions across the armed services tend to be more efficient. Some countries have recently moved toward increasing their level of joint spending, whether by requiring closer collaboration and coordination among service-specific functions or establishing joint functions. (The article “Big savings from little things: Non-equipment procurement,” p. 34, describes how some countries have centralized procurement of products and services

in certain non-equipment categories; “Supply chain transformation under fire,” p. 50, touches on the United Kingdom’s move from a service-specific supply chain to a joint supply chain.)

In this article, we highlight some of our findings in each of the three budget areas we benchmarked and offer perspectives on how countries might improve—or have already improved—performance in each area.

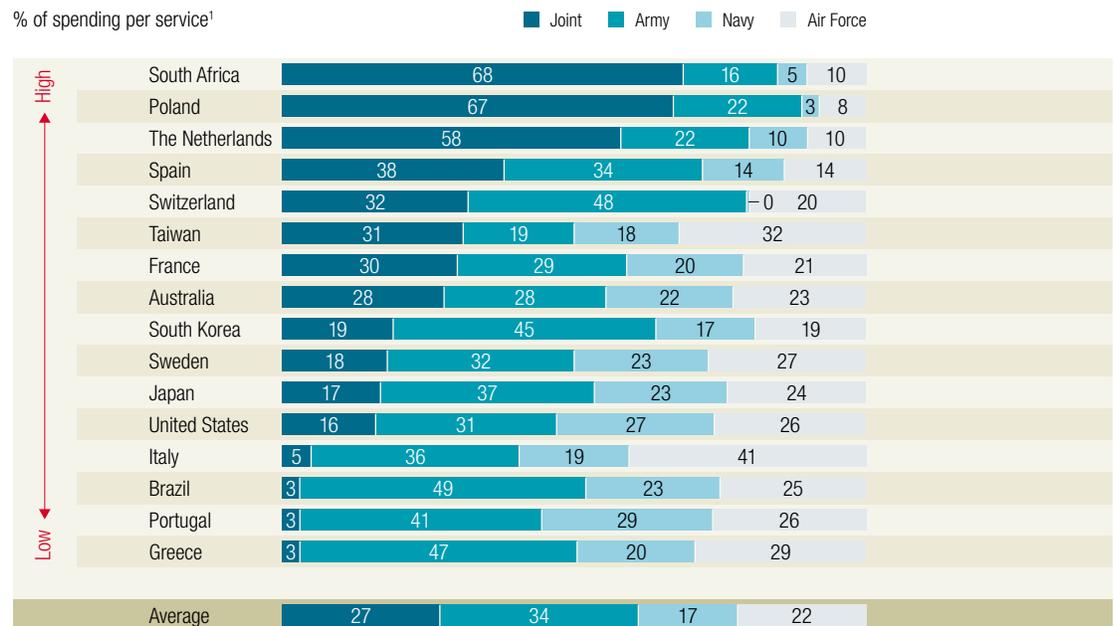
Personnel: Tooth-to-tail and deployment ratios

From most commanders’ perspectives, the true test of military strength lies in the front line—the “tooth,” in defense industry parlance. The “tail” refers to personnel who perform noncombat functions such as procurement, deep maintenance, accounting, facilities management, or back-office IT. Our benchmarking results

Exhibit 2

Level of joint spending

Countries that share more functions across the armed forces tend to derive greater efficiencies.

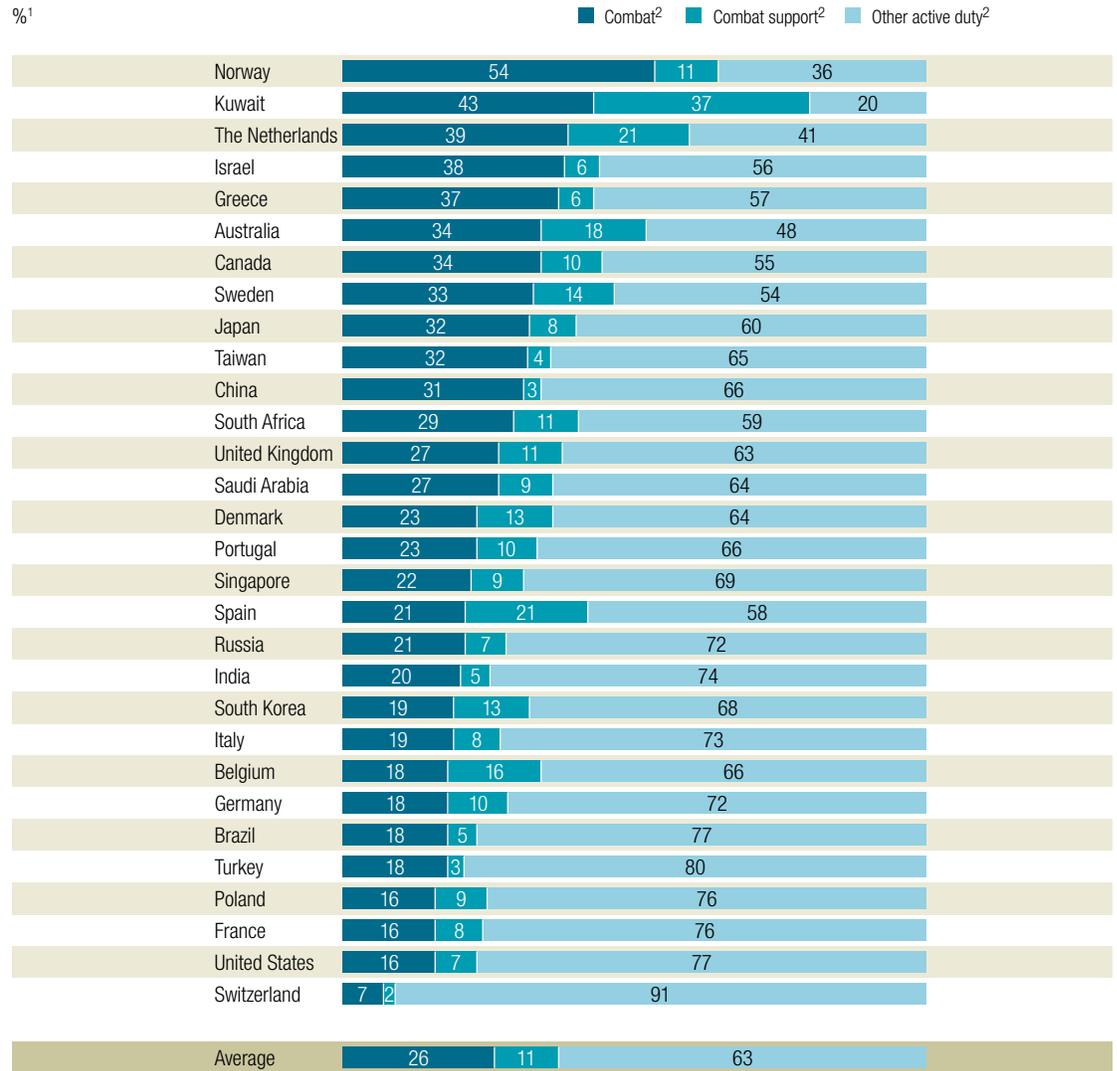


¹Figures may not sum to 100%, because of rounding.

Exhibit 3

‘Tooth to tail’ ratio

Administrative costs can be reduced without sacrificing fighting power.



¹Figures may not sum to 100%, because of rounding.

²Combat troops: armor, infantry, reconnaissance, and combat aviation. Combat support: artillery, engineers, and signals. Other active duty: general and administrative functions including HR, IT, procurement, accounting, etc.

show stark differences in tooth-to-tail ratios, indicating opportunities to reduce administrative costs in several countries without diminishing fighting power (Exhibit 3).

Some countries are proactively trying to improve their tooth-to-tail ratio. France, for example, is aiming for a dramatic reduction of administrative

personnel through investment in IT systems and outsourcing of certain noncombat operations to the private sector (see “Without taboos: France’s new defense policy,” p. 64).

The defense ministry of a Northern European nation, under pressure to increase military output in the period after the Cold War, set a goal

Our methodology for calculating output

Comparing the performance of one country's armed forces with another's involves both art and science, in part because data on budgets, equipment, and personnel are not always available, reliable, or reported in a comparable way. To develop our benchmarks, our research departments in various countries scoured public data sources and made a number of assumptions to normalize the data.

A key part of our analysis was the creation of a new metric for measuring the performance of military equipment. We call our metric "military equipment output," and we used it to calculate some of the key ratios as shown in Exhibit 1 of the article. Military equipment output is a function of four factors: volume, mix of equipment, age of equipment, and overall equipment quality.

Volume. To calculate military equipment output, we first gathered data on several countries' active equipment inventory—specifically, how many serviceable units of each type of equipment a country has in each of its armed services (for example, the number of submarines in the navy, the number of main battle tanks in the army). This exercise proved challenging because countries report inventories in many different ways—for example, some include only active equipment while others include equipment for reserves or mothballed equipment.

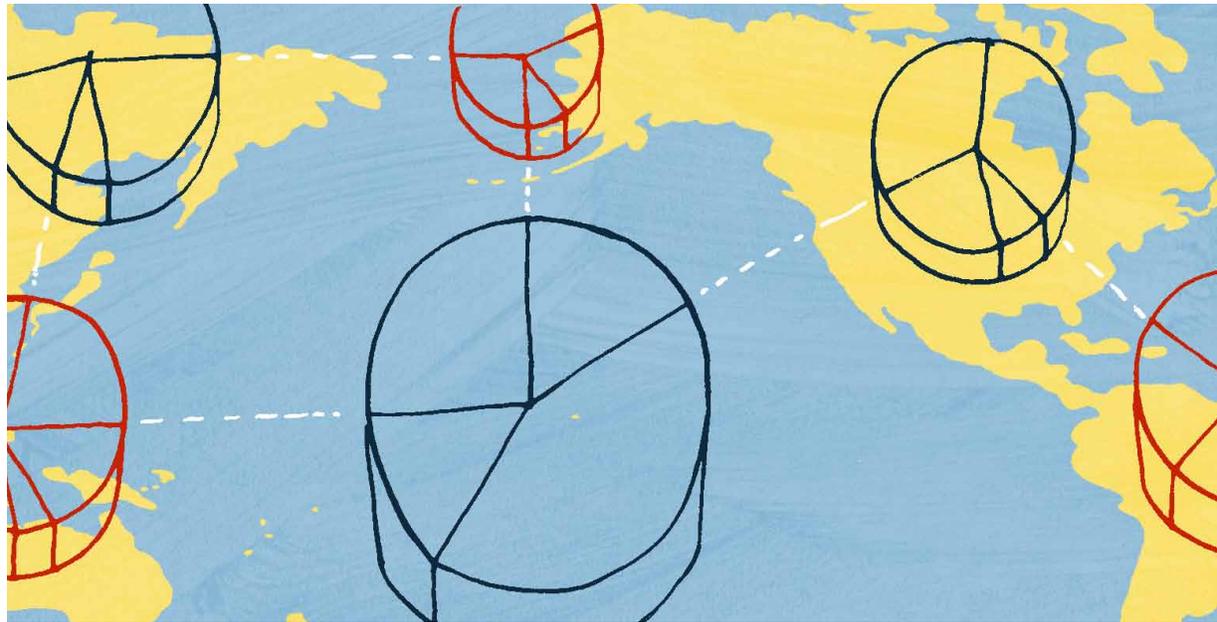
Mix. Then, using the average equipment mix of the United Kingdom and France as our ideal target mix (because both countries have a good balance of army, navy, and air force equipment in all major categories, and are sizeable enough but not so large as to skew the data), we assigned a relative value to each type of equipment per armed service—

determining, for example, that in the navy an aircraft carrier is the equivalent of 3.5 submarines or 8 surface combat ships. This allowed us to compare armed services regardless of the composition of their equipment portfolio. We excluded nuclear equipment from the benchmark because it skewed results significantly.

Age. Recognizing that there are variations even within the same type of equipment—the F-35 aircraft has significant advantages over older fighter jets like the MiG-19, for example—we also adjusted for age. We determined that a fifth-generation fighter like the F-22 or the F-35, for instance, is equivalent to 3.6 second-generation fighters.

Quality. We then took into account a military equipment quality (MEQ) score for each of the armed services in each country, based on rigorous analysis conducted by third-party consultancy Technology Futures. (For more on MEQ, read "From R&D investment to fighting power, 25 years later," p. 70.)

By calculating military equipment output for each of the armed services—the army, the navy, and the air force—we were able to make comparisons across countries. Our benchmark shows, for example, that the US and Russian armies have almost equivalent output levels largely due to the size of the Russian tank fleet, but that the US Navy and Air Force are far superior to their Russian counterparts—a case of American technology trumping the sheer volume of Russia's older platforms and aircraft. The navies of the United Kingdom and France are on par with South Korea's and Japan's, and Israel's air force has about twice the output levels of the air forces of France, Germany, and Brazil.



a few years ago to increase its tooth-to-tail ratio from 40:60 to 60:40 over three years. It achieved this goal by centralizing formerly duplicative support functions including HR, IT, finance, media and communications, health services, and facilities management. By mapping the functions' activities and resources—what exactly each function did, who did it, and how many people did it in each regiment—and by comparing itself with other public- and private-sector organizations, the defense ministry realized that centralization would yield savings of approximately 30 percent per function.

A number of countries have found that one of the hardest parts in a centralization effort is designing the precise division of responsibilities and the interfaces between the centralized service and the various military services. Political and cultural sensitivities come into play as heads of regiments lose responsibility for certain positions and facilities. The need for coordination increases exponentially, particularly because of frequent rotations among military

personnel. Individuals accustomed to tools and processes of their own choosing have to be convinced—and then trained—to use standardized tools and processes.

To ensure the success of a centralization effort, a defense organization must address mind-sets and behaviors. The European defense ministry mentioned earlier held seminars for the top 100 leaders to get their buy-in and to make sure they learned and embraced the new ways of working. To foster collaboration, the ministry also established formal mechanisms; for example, a joint management team, consisting of leaders of each military branch as well as of the centralized functions, participated in an annual prioritization process, ensuring that the most important needs of each branch were well understood and that the centralized service could meet those needs.

Like corporations, defense ministries should seek productivity improvements in administrative functions; in these nonmilitary tasks, productivity growth can and should offset wage growth.

Exhibit 4

Deployed forces

SAMPLE FROM BENCHMARK

Combat forces are under strain in some countries.

	Total active (number of people)	Total deployable ¹ (number of people)	Deployed (number of people)	Deployed over total active (%)	Deployed over deployable (%)	Cost per troop deployed (\$ thousands)
United States	1,352,494	N/A	250,000	18.5	N/A	N/A
United Kingdom	185,950	74,750	34,000	18.3	45.5	N/A
The Netherlands	44,636	17,724	3,896	8.7	22.0	68
Finland	10,100	6,000	840	8.3	14.0	216
Sweden	11,574	3,122	950	8.2	30.4	611
France	262,592	42,500	17,485	6.7	41.1	35
Italy	191,152	54,800	11,170	5.8	20.4	N/A
Spain	77,800	39,617	3,344	4.3	8.4	195
Germany	221,185	37,275	8,946	4.0	24.0	172
Greece	135,500	22,182	1,290	1.0	5.8	83

¹Troops trained and ready to deploy.

Increased productivity in back-office functions can then lead to more favorable deployment rates, as uniformed personnel can be reassigned from support roles to combat roles. A country needs to have many more deployable service members than it might expect to deploy at any one time to account for periods of training and recuperation. In certain countries, combat forces are stretched thin, with deployment rates exceeding 40 percent of potential (Exhibit 4). These countries have the choice of either reducing deployments—which will essentially mean a loss of fighting power—or shifting a significant number of personnel from administrative roles to combat roles. The latter is clearly the better option.

Equipment procurement

In general, countries that make it a point to support their domestic defense industries have higher procurement costs than those that rely on imports. Countries that procure older equipment from the global market tend to

have very capable fleets for less money.

The United States and Australia are the lowest-performing countries with regard to equipment output for every dollar spent (Exhibit 5).

One could argue that a strong domestic defense industry is strategically critical to national defense; among other benefits, it gives a country complete control over supply, keeps it from being dependent on foreign providers, and guarantees sovereign protection in critical areas (secure satellite systems, for example). But because maintaining and supporting a domestic defense industry is an expensive proposition and will limit financial freedom in other areas, it is critical that countries have a well-defined defense industrial strategy.

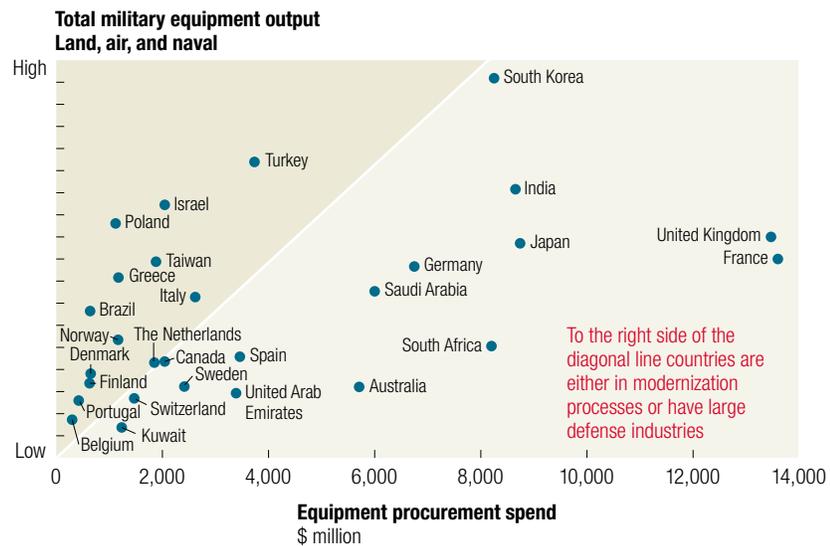
Countries with sizable defense industries but declining defense budgets—examples include Germany, South Africa, Sweden, and the United Kingdom—must evaluate each of

their defense subsectors (for example, secure communications, missiles, unmanned aerial vehicles) on two criteria: strategic criticality and commercial viability. Strategic criticality is a qualitative evaluation that considers the subsector’s importance to military success, whether there are other countries exporting the product, and sovereign importance (that is, whether a bespoke product ought to be manufactured domestically for security reasons,

as might be the case with encryption software). Commercial viability is a quantitative assessment based on revenue, margins, and cost base as well as local and global competitiveness. Subsectors that score high on both criteria ought to be prioritized through R&D funding and export support; subsectors that rate high on only one criterion should receive limited government support; and subsectors with low criticality and viability should be considered for divestiture.

Exhibit 5
Output versus spend

Governments that support their domestic defense industries tend to spend more for less output.



Output/expenditure (index)

Brazil	330	Italy	85	Saudi Arabia	38
Poland	287	The Netherlands	72	Kuwait	36
Russia	253	Canada	67	Japan	33
Greece	214	Israel	66	United Arab Emirates	27
Belgium	208	China	63	United Kingdom	22
Portugal	199	South Korea	62	France	20
Denmark	189	Switzerland	58	South Africa	18
Finland	170	India	42	United States	17
Taiwan	144	Sweden	41	Australia	17
Norway	135	Spain	40		
Turkey	108	Germany	39	Average	100

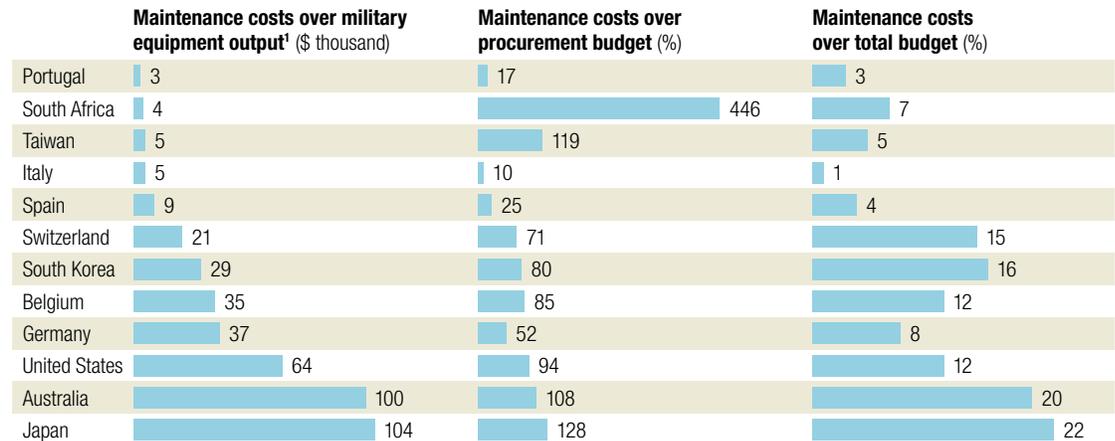
Note: United States, Russia, and China have been excluded from the top chart due to scale.

Exhibit 6

Maintenance costs

SAMPLE FROM BENCHMARK

Variability shows that there is room for low performers to improve.



¹One unit of military equipment output is approximately equivalent to one combat-ready unit (eg, a manned and maintained combat vehicle). For more, read "Our methodology for calculating output," p. 8.

Countries that are increasing their defense spending and looking to grow a nascent domestic industry—India or South Korea, for example—should undertake a similar evaluation, but assess *future* commercial viability (as opposed to current revenue, margins, and costs) based on comparative advantage and ability to leverage key capabilities such as engineering talent.

This type of evaluation requires both commercial and analytical skills as well as military strategic-evaluation skills. Defense ministries should create cross-functional teams so that sound commercial and economic analysis can inform equipment-procurement decisions.

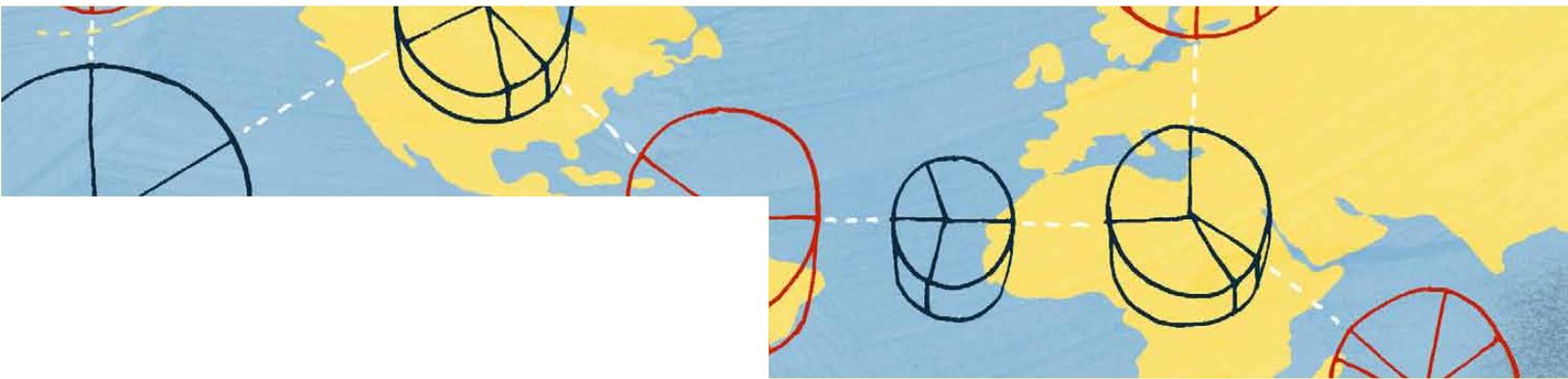
Maintenance

There is dramatic variability in the cost of maintaining a fleet, with some countries spending as little as 1 percent of their total defense budget on maintenance and other countries spending more than 20 percent (Exhibit 6). The disparity suggests massive opportunities for

improvement in some countries. Indeed, our experience working with a number of defense organizations indicates a 40 percent to 60 percent potential for increasing the quality and productivity of the maintenance, repair, and overhaul (MRO) function without increasing costs. We have found that the best-performing military MRO organizations make smart use of outsourcing, excel at contracting, and constantly optimize their maintenance processes.

Making outsourcing decisions in MRO is complex. Leaders must make trade-offs as they seek to simultaneously reduce costs, develop and retain in-house capabilities, minimize duplication of effort, and gain access to the most sophisticated MRO skills. Some defense organizations have vendors and military personnel working side by side—an arrangement that is difficult to implement and manage, but that can yield significant benefits.

Given the long life cycles of most military equipment, the maintenance contracts that



cover parts and service have a dramatic impact on the total cost of ownership (TCO) of major assets. Decisions made at the time of purchase can have impact even 30 years later. With maintenance costs often accounting for more than 70 percent of TCO, getting the initial contract right is absolutely critical. Defense organizations have achieved impressive cost reductions by introducing sophisticated performance-based contracts and equipment-failure feedback loops.

Improving maintenance processes is the subject of another article in this issue (see “Mastering military maintenance,” p. 28). But regardless of which steps a defense organization takes to improve MRO performance, it must ensure that two equally important groups of leaders are engaged in the change effort: the frontline commanders, who are the end users of the equipment, and the heads of the logistics and MRO functions. These groups

are likely to have different concerns. Whereas frontline leaders want greater asset availability, logistics and MRO management are focused on making the best use of limited budgets. Communications to each group about new MRO protocols and processes should highlight the benefits to that particular group.



One of the cornerstones of any benchmarking exercise is the selection of a peer group. Once a defense ministry has chosen its peer group, it can identify the areas in which it most needs to improve and implement best practices to elevate its performance in those areas. The benchmarking results can give valuable directional insight into where the ministry can save money, as well as where it can achieve maximum effectiveness without increasing costs—both critical goals in today’s changed world. ○