

A large American flag is flying in the foreground, partially obscuring a massive industrial building. The building has a large, white, triangular structure on its left side. In the foreground, a large red cylindrical object, possibly a missile or a large pipe, is being worked on. The scene is illuminated by bright lights, suggesting an indoor industrial setting.

KEEPING AMERICA COMPETITIVE:

The Military Needs To
Limit Its Industrial Roles

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Findings In Brief

During the Cold War, the U.S. military acquired a vast network of public-sector industrial facilities and private-sector suppliers. Over time, a division of labor emerged between the two segments of the defense industrial base: private companies would develop and manufacture combat systems, while public facilities would maintain and repair them. Although this arrangement required the government to fund two parallel industrial systems, it worked reasonably well as long as the U.S. economy generated the wealth necessary to support a vast “military-industrial complex.”

However, in recent years the U.S. economy has begun to falter and the federal government’s debt has risen rapidly. That has led to a widespread belief that the government needs to reassess how its activities impact economic performance. One facet of the debate is the relationship between military spending and the nation’s industrial base. While it is indisputable that Pentagon research has led to important technological breakthroughs such as computers, jet engines, lasers and the Internet, other facets of the military enterprise may be impeding economic competitiveness and progress.

A case in point is the industrial functions performed by federal facilities such as depots and shipyards.

These facilities, which typically employ thousands of workers, often provide services that could be obtained from private companies. In the process, they drive up the government’s fixed costs, contributing to budget deficits. They also fracture the product life-cycle of combat systems by requiring transfer of the systems from the private sector to the public sector, largely severing the relationship between developers and maintainers. In addition, they undercut the potential for economies of scale that have long been recognized as crucial to maximizing efficiency. Beyond that, they reduce the trade competitiveness of some of the nation’s biggest exporters while slowing the pace of innovation in the industrial segment of the economy.

This report explains why performance of industrial activities in military depots and shipyards can be detrimental to the nation’s broader economic goals. It acknowledges the contributions of public-sector facilities, but argues that the range of industrial functions they accomplish should be limited to assure they do not impede the potential of the larger economy. The report was written by Dr. Loren Thompson of the Lexington Institute staff as part of the institute’s continuing inquiry into the relationship between U.S. economic and security policies.

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Overview: Military Performance Of Industrial Activities May Harm The Economy

During the 40 years of U.S.-Russian tensions known as the Cold War, the Department of Defense assembled a vast network of government-owned industrial facilities to support the nation's military posture. Some of the facilities, such as the Navy's public shipyards, traced their histories back over a century to the early days of the republic. Others were of more recent origin, like the Air Force logistics centers located in Georgia, Oklahoma and Utah. All of them were engaged in supporting combat systems through activities such as manufacturing, maintenance and supply management. These functions were essential to sustaining the readiness and relevance of weapon systems whose operational lifetimes often spanned many decades.

The United States also acquired a sprawling private-sector defense industry during the Cold War. The government had previously depended on mobilization of commercial companies such as auto manufacturers to produce military goods in wartime, but the persistence of the Russian threat and the global security role that U.S. forces had assumed dictated creation of a dedicated peacetime defense industry. Over time, a division of labor emerged between the public and private components of the military's industrial base: private companies would develop and manufacture combat systems, while public facilities would repair and sustain them.

However, the dividing line between the two sectors has never been well-defined. Private companies often propose to take on the sustainment of weapons systems that they have manufactured, arguing that they have a superior understanding of the technologies involved. Public facilities such as depots and shipyards, on the other hand, frequently pursue an expansive definition of their responsibilities in modifying, upgrading and supporting equipment, arguing that they are more re-

sponsive to warfighters. Frictions surrounding the allocation of work to the two sectors typically is most intense when wars are ending and military budgets are shrinking.

In the past, these frictions have been mainly about jobs and money. However, a new dimension to the debate is emerging as a result of the decline in America's manufacturing base. As industries closely related to U.S. security such as electronics and aerospace gradually lose global market share, the federal government has begun to reexamine its role in preserving key industries. One sign of this reevaluation was the decision of the government to subsidize car makers facing insolvency during the recent recession. Another sign is the persistent debate about whether the Department of Defense -- the world's largest consumer of advanced technology -- should be organizing its purchases with an eye to economic impacts.

This study argues that the government needs to think more clearly about the impact its military depots, shipyards and logistics centers have on the nation's industrial economy. It identifies five major ways in which an overly expansive role for public-sector industrial facilities undermines the efficiency, competitiveness and pace of innovation in the broader economy. Furthermore, it argues that by competing with private companies already under considerable pressure from shareholders, regulators and foreign rivals, the public-sector facilities make it harder for the nation to preserve the robust, world-class economy needed to sustain America's global military posture. The study does not deny the value of public-sector providers, but it contends their roles should be limited so they do not impede the ability of private companies to succeed in an increasingly competitive global economy.



A Marine Corps variant of the F-35 Joint Strike Fighter demonstrates vertical ascent and descent capabilities at sea. The F-35 was designed to facilitate every facet of life-cycle support, however developing and producing it in the private sector and then shifting sustainment to the public sector incurs costs that could be avoided by assigning more support responsibilities to the manufacturer. (Image: Lockheed Martin Corporation)

The Military Operates An Extensive Network of Government-Owned Industrial Facilities

The Department of Defense owns dozens of industrial facilities, some of which are so large that they are the biggest employers in their host states. Many of these facilities were established prior to the Cold War, when the scale of peacetime military spending was too small to sustain a dedicated private-sector defense industry and the government therefore was required to manufacture and maintain the equipment used by the armed forces. During World War Two, the government built many new factories and facilities to support the war effort, some of which continued operating after the conflict either as federal facilities or as manufacturing sites for military contractors. Despite repeated efforts since the 1970s to reduce, rationalize and privatize the defense department's publicly-owned industrial complex, each of the military departments today maintains an extensive network of organic industrial facilities that collectively cost the government tens of billions of dollars each year to operate.

The Navy Department's organic industrial capabilities are concentrated in four shipyards managed by the Naval Sea Systems Command and three aviation depots managed by the Naval Air Systems Command. Additional sites provide support of electronic gear and Marine Corps ground combat systems. All of these facilities are essential participants in the sustainment of core warfighting systems. Despite political resistance to eliminating local jobs, the Navy Department has worked hard to eliminate waste and duplication in its organic industrial facilities, drastically reducing the number of depots and shipyards over the last several decades. However, the need to efficiently utilize its remaining facilities often results in work being performed on warships, aircraft, ground vehicles and electronic systems that could have been executed by the original private-sector manufacturers or third-party maintenance providers.

The Army Materiel Command oversees a network of 20 depots, arsenals and ammunition plants involved in diverse industrial activities. Much of this activity entails the manufacture of items the service believes cannot be reliably or affordably procured from private-sector sources, such as chemical and biological weapons protective gear and specialized ammuni-

tion. The biggest organic industrial facilities operated by the Army are its five overhaul and repair depots, which each specialize in the support of particular types of systems such as rotorcraft, ground vehicles and electronic equipment. Although the repair depots spend extensively on capital equipment and training of skilled personnel, they tend to lag behind private-sector sources in efficiency. One way the service has sought to keep its industrial facilities current is by partnering with big technology companies such as General Dynamics and Raytheon.

Air Force industrial capabilities are concentrated within the Air Force Materiel Command, which oversees three very large air logistics centers, two test centers, and a variety of other facilities. The Air Force did not move as fast as the other services to rationalize its organic industrial base after the Cold War ended, and as a result had the closure of two logistics centers forced on it by a base closure commission. Its three remaining logistics centers in Georgia, Oklahoma and Utah each employ thousands of civilians engaged in the maintenance and modification of airframes, engines, electronics and armaments. Although they are highly competent at what they do, there is perennial friction between the service-operated facilities and private-sector providers over the allocation of workloads, with the public facilities regularly pressing to "insource" work previously performed by contractors.

As overseas contingencies gradually wind down, the government-operated industrial sites of the military services are experiencing shrinking demand for their services. That is especially true of Army arsenals and depots, which were overwhelmed with demand for their services at the height of the war effort and therefore elected to outsource sizable workloads. The depots are now trying to pull some of that work back in-house to preserve their capabilities. Federal law mandates that much of the most demanding repair and sustainment work must be performed by federal workers at federal sites. However, there is persistent controversy about how discretionary workloads should be assigned, with Congress usually weighing in on the side of government-operated facilities.

The Private Sector Defense Industry Is An Engine Of Economic Growth and Innovation

The U.S. private-sector defense industry is the largest concentration of military suppliers in the world. The United States currently generates 42 percent of global military spending, and it probably accounts for an even larger share of military technology outlays. The Department of Defense awards about \$400 billion in contracts for military goods and services each year, with additional security-related technology expenditures originating in the Department of Energy (which manages nuclear weapons production), the Department of Homeland Security (which houses the Coast Guard), and the Department of State (which oversees foreign assistance). The United States is also by far the biggest exporter of military technology in the world, with sales in 2010 exceeding \$30 billion. Virtually all of these exports are manufactured by private-sector military contractors.

The modern defense industry came into being during the early days of the Cold War, when the persistence of security threats posed by the Soviet Union led to unusually high levels of peacetime military spending. The country's previous approach to meeting military needs had been to maintain a modest public-sector industrial base in peacetime and then surge defense production when wars arose by mobilizing commercial industry. That model was unsuitable for dealing with the Soviet threat, because the U.S.-Russian rivalry played out largely in the technology arena, and U.S. warfighters therefore needed a supplier base specialized in the development and production of advanced combat systems. Thus, while many big commercial companies like General Electric and IBM supplied the military, the persistent threats and elevated military spending of Cold War years resulted for the first time in the emergence of a vast private-sector defense industrial base.

Over time, a division of labor developed between the public and private sectors in supplying the military. Public-sector arsenals and shipyards gradually relinquished their roles in the design, development and manufacture of combat systems to focus on post-production support and sustainment of fielded systems. These activities typically included functions such as maintenance, repair, modification and remanufacture of worn out systems. Meanwhile, private industry concentrated on the design, engineering, and integration of combat

systems. The division of labor between the two sectors worked reasonably well, but there were persistent frictions over the allocation of certain types of work that involved engineering and sustainment of complex technological systems. These frictions were most pronounced at times when military budgets were shrinking -- times like today.

As the Department of Defense became the biggest consumer of advanced technology in the world, the private-sector defense industry gradually took on important roles in fostering economic growth and technological innovation that were not well understood by policymakers. Many of the most important new technologies to emerge in the postwar era, such as computers, jet engines, lasers and digital networking, were developed by contractors working on military programs. The basic ideas behind innovations such as the Internet sometimes originated in government agencies, but the development, production and subsequent commercialization always occurred in the private sector. It is no exaggeration to say that new technologies pioneered by defense contractors during the Cold War transformed the character of the U.S. economy, creating tens of millions of jobs while reshaping every facet of commerce and culture.

Unlike their counterparts in the public sector, private-sector military contractors operate in a business environment that is shaped largely by market forces. They must be responsive to the interest of shareholders in steady profits, and they must invest continuously in new technology and skills to remain competitive with other suppliers. On the other hand, as military contractors they are subject to a complex array of regulations that does not exist outside the federal marketplace. There is usually only one customer for the military goods and services they provide -- the government -- and the pattern of demand exhibited by that customer bears little resemblance to the commercial business cycle. Thus, defense companies occupy a unique niche in the U.S. economy, and their viability depends on the goodwill of a monoposony customer often motivated by non-economic concerns. When policymakers fail to grasp the peculiar circumstances in which the defense industry operates, they can cause grave damage to the industrial base.

Public Sector Performance of Industrial Activities Increases Federal Costs and the Deficit

The debate over how post-production support and sustainment of military equipment should be performed traditionally has played out within narrow boundaries. Policymakers in the Department of Defense have weighed the likely cost of accomplishing necessary work in public or private facilities, and sought to determine which sources were likely to be most competent and responsive. Congress, or at least those legislators focused on the issue, have been concerned primarily with local economic impacts, meaning they tend to favor whatever solution secures jobs in their districts. Laws requiring that 50 percent of complex maintenance and repair be performed by federal workers in federal facilities are cast mainly in terms of military readiness, but their legislative history suggests that much of the motivation for enactment originated in local economic concerns.

However, the deterioration of federal finances over the past ten years has increased the relevance of efficiency in the debate over defense industrial policy. Because the current level of government borrowing is widely deemed to be unsustainable, Pentagon policymakers are scrutinizing every facet of the military enterprise for potential savings. The drive for savings will inevitably lead to a reassessment of the way in which the military executes sustainment work, and what analysts will find is that the current approach of maintaining a vast public-sector infrastructure and workforce is intrinsically wasteful. The Department of Defense could save hundreds of billions of dollars over time by transferring much of the work it performs organically to private-sector providers.

The waste associated with the present system originates mainly from three sources. First, military demand for industrial services rises and falls dramatically depending on the operating tempo of the joint force, but unlike the private sector, government depots and shipyards cannot combine military work with other types of work to assure efficient utilization of assets during demand troughs. Second, much of the work performed in public-sector facilities involves skills and equipment already resident at sites owned by original equipment manufacturers, meaning the government must in effect pay for two parallel industrial bases -- one that manu-

factures combat systems and one that sustains them. Third, the federal civil service and military personnel system do not have sufficient flexibility to generate the kinds of savings seen in private-sector enterprises when declining demand leads to workforce reductions.

The latter factor -- divergent employment practices -- is an especially potent source of waste in the current federal system. The typical pattern in the private sector when demand for goods or services softens is to either redeploy or furlough workers as a way of reducing costs. That option often is not open to government facilities when demand reductions occur because of protections granted to federal workers. Even when demand is robust, the carrying cost of federal workers is much higher to the government than that of private-sector employees who are engaged in supporting the military. A 2010 study by the Defense Business Board found that 339,000 active-duty military personnel were engaged in performing "commercial activities," at an average annual per capita cost of \$160,000. That level of compensation is far above prevailing rates in the private sector, and it is driven in part by financial commitments to military personnel that often persist decades into retirement. The disparity in compensation between public and private civilian workers is not as pronounced, but the duration of federal financial commitments to public-sector civilians is similarly long, costing trillions of dollars over several decades.

In contrast, the government's obligation to the employees of private-sector enterprises only endures as long as those companies are engaged in supplying goods and services to the government. If demand slackens and the government ceases purchasing from an outside supplier, its obligation to that supplier's employees ceases. The profound difference in federal obligations to public and private workers, when combined with the other inefficiencies associated with sustaining a public-sector industrial base, greatly adds to the fixed costs of the federal government, and thus to the burgeoning national debt. While public depots, arsenals and shipyards may sometimes match the proficiency of private sources and surpass them in responsiveness, those benefits are achieved at a very high cost that the government seldom seeks to monitor or control.



The amphibious transport dock ship Green Bay under construction at a private-sector shipyard on the Gulf Coast. Warships have become much more complex as a result of the information revolution, requiring support and sustainment skills that often can be obtained more affordably in the private sector than through traditional, public-sector channels. (Image: Huntington Ingalls Industries)

Public Sector Performance of Industrial Activities Fractures Product Life Cycles

Because of the way the military industrial base evolved, the standard business model in the defense sector today is for private companies to design, develop and produce combat systems that are then turned over to public sector organizations for sustainment during their operational lives. Exceptions are made when it is deemed more cost-effective for original equipment manufacturers or third party maintenance providers to support fielded equipment, but the government almost never produces complex systems organically and the private sector by law cannot perform most of what is called depot maintenance (the most demanding repairs and overhauls). This division of labor emerged over time in response to military and political conditions, and does not correspond with prevailing practices in the rest of the economy.

The most widely used business model elsewhere in the economy, especially in the case of complex technological products, is known as “integrated life cycle management.” It centers on the idea that all products have a life cycle similar to that of living organisms that begins with conception, progresses through development to maturity, and then extends through a prolonged period of useful activity before retirement or renewal. The key stages in the product life cycle of any advanced technological system are design, development, production, operations, modification and withdrawal from service. In the case of combat systems, any one of these stages may persist for a decade or longer, so that equipment often becomes operational decades after it was initially conceived, and remains fielded for decades after that before being retired. In other words, a major combat system may have a product life cycle similar in duration to that of a human being, and like a person the combat system may see major restorative actions in later years intended to extend its useful life.

Management experts generally agree that best results are obtained when each stage in the product life cycle is informed by what has happened or will happen in the other stages. An integrated plan is thus required. That enables designers to work closely with manufacturers, and manufacturers in turn to apply their insights to the challenge of sustaining and modifying the product during its service life. Integrated life cycle management maximizes knowledge at each stage in the process while generating the greatest returns from each increment of investment.

Although private companies often weigh the desirability of “outsourcing” some activities not considered core competencies at each stage in the life cycle, their decisions are almost always shaped by an integrated plan for how products should progress through the various steps of the life cycle.

This is not the model used with military equipment, though, because what typically happens once combat systems enter full-rate production is that responsibility for the later stages in the product life cycle is turned over to the public sector facilities. Those facilities, such as air logistics centers and naval shipyards, played no role in developing or integrating the final system, and thus cannot benefit directly from the knowledge gained in doing so. Instead, they must re-invent the knowledge and skills already resident at the original equipment manufacturer to maintain and modify the product. They also must replicate tooling, information systems, supply chains and other features essential to the long-term sustainment of the product. As noted in the previous section, this duplication of investment is intrinsically wasteful, since the government must pay for parallel industrial bases. But it also causes other problems, because maintainers can seldom achieve the level of knowledge on the products they support that developers achieved, and developers will seldom benefit from the insights maintainers gleaned in supporting the fielded system.

In other words, routine federal performance of industrial activities dis-integrates the product life cycle for whatever items the government is maintaining or modifying. Rather than benefiting from an integrated approach to life cycle management, military equipment often suffers from a fracturing of industrial processes that diminishes the value of government investments. Knowledge is lost, capital equipment is under-utilized, and the cross-fertilization of disciplines so commonplace in commercial enterprises like Caterpillar and Ford is minimized. Government maintainers have tried to limit the drawbacks of this sub-optimal business model by partnering with original equipment manufacturers like General Dynamics and Raytheon, but that can’t fully rectify the problems that arise when one culture designs and develops a complex technological product, and then turns it over to a very different culture for maintenance and modification.



The Air Force's stealthy B-2 bomber in flight. Planes such as the B-2 that are produced in small numbers and incorporate unique features may require continuous contractor support due to a lack of relevant skills in the public sector, highlighting the need to rigorously analyze when it makes sense to invest in public-sector support capabilities, and when those capabilities are more efficiently secured from other sources. (Image: Northrop Grumman Corporation)

Public Sector Performance of Industrial Activities Diminishes Economies of Scale

Just as public sector performance of industrial activities associated with equipment sustainment fractures product life cycles, so it also undermines the potential for economies of scale. Economies of scale are efficiencies made possible as the size of an enterprise increases, resulting in declining prices for each additional unit of output. This phenomenon was first noted by economist Adam Smith in the 18th Century, when he observed that as the scale of production for a given good increased, workers could become more efficient through division of labor and specialization. Simply stated, the more narrowly-defined each worker's job was, the better he or she could become at it through learning and the skilled application of production inputs. Thus, output would increase faster than costs and the price of each item manufactured would fall.

A seminal essay by T.P. Wright that appeared in the February 1936 issue of the *Journal of the Aeronautical Sciences* explained how the scale of production in industries with large fixed costs was related to efficiency. The essay reasoned that if the same range of skills and tooling had to be applied to the production of a system no matter how many items were manufactured, then it followed that unit costs would tend to diminish as production runs increased because each worker and piece of equipment would be applied more effectively. That is why, for example, the unit cost of military aircraft tends to rise as the number assembled each year falls: low rates of production under-utilize the available capacity of workers and plant, which nonetheless must be maintained to make the finished product possible.

In the case of military equipment, many of the inputs required to develop and manufacture finished systems are also utilized in the sustainment process, including engineering, purchasing, tooling, physical infrastructure, touch labor skills and management talent. If these inputs can be applied with maximum efficiency as activity rates increase, then the cost of each additional increment in output should tend to decrease. The resulting economies of scale could be further enhanced through the learning process associated with repetitive performance of technical tasks. In other words, the

more any particular task is performed within a suitable structure of incentives, the better the results should be in terms of the quantity and quality of output. Thus, goods and services that might be extremely expensive to provide at low rates of performance become more affordable and accessible to a wider range of users.

However, the current approach of splitting industrial responsibilities between public and private sectors in the production and sustainment of military equipment severely undermines the potential for economies of scale. Rates of activity are reduced, pooling of talent is precluded, tooling is under-utilized, and the learning process is impeded by organizational and cultural barriers. Rather than generating economies of scale, the existing system creates dis-economies because it cannot be managed in an efficient fashion. For instance, the physical plant and skills required to manufacture a military transport or armored vehicle cannot be applied to its sustainment if it is maintained by a public sector facility, requiring duplicative investment and activity at a different site that drives up the cost of the system.

Even when public and private facilities involved in providing a good or service are well managed, it is impossible to maximize economies of scale due to the way in which processes are fragmented by divergent practices and regulations. The justification for operating the industrial base in this manner usually is that the military requires a secure source of industrial skills and support, but the detrimental effect this has on cost efficiency actually undermines that goal unless vast amounts of discretionary funding are available. In the current fiscal environment, where the availability of money for all military functions is expected to decline over time, it makes little sense to impede the economies of scale that help make sustainment providers efficient and the broader economy competitive.

Public Sector Performance of Industrial Activities Undermines Trade Competitiveness

It is not hard to see how government performance of industrial activities might impact federal spending, product life cycles, and economies of scale. However, there are other economic consequences of assigning industrial functions to public sector facilities that are less apparent. One such consequence is to weaken the trade competitiveness of the nation's leading industrial companies. Government depots and shipyards do not play any direct role in the nation's trade balance, but the military contractors whose weapons they repair and modify are among the nation's biggest exporters. The United States is currently the dominant player in the global arms trade, claiming a 53 percent share of the world market in 2010, and several of the largest U.S. defense companies expect to export over 20 percent of their military output in the years ahead.

The role of major aerospace and defense contractors in the nation's trade balance extends well beyond military products. Boeing is one of only two major producers of commercial transports in world. United Technologies and General Electric are key producers of commercial jet engines. General Dynamics is the leading source of long-range business jets. When the commercial, civil and military exports of such companies are combined, they add up to one of the rare bright spots in America's disappointing trade performance of recent years. That balance reached a low point in 2008 when the nation imported \$840 billion more merchandise than it exported, and the merchandise trade deficit has remained well above \$500 billion in subsequent years despite the dampening effects of a global recession. However, U.S. trade performance in aerospace and defense goods has been consistently positive despite the emergence of new overseas competitors.

That pattern will not persist, though, unless U.S. exporters have the same government support enjoyed by their overseas rivals. The federal government helps U.S. aerospace and defense exporters by sustaining robust home-market demand that can be leveraged into foreign markets, and by facilitating trade with allies. But it also undermines the trade competitiveness of potential exporters by fracturing the product life

cycle of systems, reducing economies of scale, and diverting business from factory floors to federal facilities where no contribution to a company's capacity or capabilities can occur. For example, the future of several military aircraft production lines such as that of the F-16 fighter depends on whether prime contractors can find new overseas customers for the planes; however, when the maintenance of aircraft in the domestic military fleet is performed mainly in government depots, that deprives the companies of revenues vital to building the business case for continuing to pursue foreign sales.

Military planners seldom give any thought to how sustainment decisions might influence U.S. trade competitiveness, because that concern lies outside their area of responsibility and expertise. As a practical matter, though, anytime business that might have gone to a weapons exporter is instead assigned to a public sector facility, it weakens the capacity of the exporter to sell into global markets. The company has less money to invest in product development and marketing, increased overhead costs on remaining business drives up the price of exports, and skilled workers must be furloughed who might have contributed to future business successes. In effect, public sector depots and logistics centers become competitors who diminish the capacity of U.S. companies to compete effectively in global markets. That ultimately hurts not just the companies, but the military itself, since America's ability to sustain a global defense posture depends on possessing the kind of highly competitive economy that can generate the resources to support such a posture.

Public Sector Performance of Industrial Activities Impedes Technological Innovation

Perhaps the least recognized way in which public sector performance of industrial functions is detrimental to larger national purposes is its negative impact on innovation. There was a time during the Cold War when government laboratories and testing facilities were at the cutting edge of modern technology, producing major advances in everything from computer software to materials science. However, that era began to fade even before the information revolution unfolded, and the notion of commercial spinoffs from military research has now been replaced by a pattern of borrowing commercial innovations for military use. Many of the new technologies being installed in the latest generation of combat systems utilize breakthroughs pioneered by commercial companies and then adapted to military roles. Such technologies increasingly come from overseas sources.

Because of the way in which the sources of new technology have shifted, sending military systems to public sector depots for repair and modification means isolating them from the mainstream of global innovation. That innovation now occurs almost exclusively in the commercial world, and government depots only embrace breakthroughs long after they have been proven in the private sector. This results partly from the management culture of public sector facilities, and partly from the slow pace with which investment funding is appropriated and applied in the federal sector. In a globalized economy, commercial companies are under constant pressure from competitors and therefore must introduce useful innovations as fast as possible. For example, new generations of computer operating systems, memory chips and digital communications gear are introduced every one or two years, and companies can lose market leadership almost overnight as a result of breakthrough products developed by rivals. There is nothing remotely resembling the structure of incentives this fast-paced operating environment spawns in the public sector. Instead, military depots, shipyards and logistics centers are guaranteed workloads by law and thus have little need to keep up with the latest innovations in the private sector.

Even if the government were to change its budgeting

system to speed the rate at which new technologies and skills can be introduced at public sector facilities, there are other barriers to innovation in the federal environment. Government workers and facilities operate within a dense web of rules and regulations that dictate how tasks must be performed, and who can perform them. These standards often were conceived with the goal of promoting political or social goals unrelated to productivity, and thus they discourage efficiency despite their other positive effects. The adoption of new processes or production techniques is often impeded by such regulations, because it requires changes in longstanding labor or investment practices that must be approved by an external authority. Although some public sector facilities strive to stay abreast of breakthroughs in the commercial world, the delays in winning approvals and appropriations necessary to implement changes makes that nearly impossible. The federal government simply was not set up to move at the speed of the marketplace.

What this means in practical terms is that military systems sent to the private sector for repair or modification are likely to benefit from the latest technological breakthroughs, whereas those sent to public sector depots will not. The public sector facilities are not rewarded the way private companies are for being early adopters of the latest innovations, and thus they tend to lag in their physical plant, skills and processes. The gap in performance between public and private sector providers generally increases as the technological sophistication of the product being supported does, so the gulf is most noticeable on new technology like low observables and composite materials. But the negative consequences of relying on outdated practices doesn't fall solely on the military, because it is the availability of workloads using cutting-edge innovations that makes it possible for private sector providers to implement such breakthroughs. Thus, on products incorporating dual use (military and commercial) technologies, the diversion of sustainment work into public facilities undercuts the opportunity for innovation across multiple markets. Military depots thus become a drag on productivity and competitiveness far beyond the defense sector.

Conclusion: The Military Needs To Limit Its Industrial Activities

The Pentagon's organic depots and private contractors have thrived in recent years as defense spending surged to cope with the demands of multiple overseas military campaigns. However, the rest of America has not fared so well: the U.S. share of global economic output fell from 32 percent to 24 percent in the ten years following 9-11, China surpassed the U.S. in most measures of industrial production, and an average of over 40,000 manufacturing workers lost their jobs every month for ten straight years. America has won the war against Al Qaeda, but it is gradually losing the race to remain the world's preeminent economic power.

The growing sense of unease about America's economic future coincides with a period in which defense spending is expected to decline, due partly to the waning of overseas wars and partly to the need to rein in a federal budget deficit that is growing by billions of dollars each day. These trends suggest a need to rethink the relationship between defense spending and economic needs. The United States has been a leading industrial power for so long that there was little incentive for policymakers to consider how the way weapons were acquired and sustained might impact on the broader economy. However, with the nation gradually growing poorer -- the federal budget deficit in fiscal 2011 averaged about \$10,000 per taxpayer -- it is no longer reasonable or desirable to make defense choices in isolation from broader economic concerns. The United States currently generates nearly half of all global military outlays, and its leaders need to think more clearly about how that vast amount of spending might be helping or hurting the nation's economy.

One area where the connection between defense and the economy definitely needs closer examination is the military's role in developing, producing, repairing and modifying weapons systems. There is little question that military research has played a seminal role in keeping America at the cutting edge of industrial innovation, helping to spawn technologies such as computers, jet engines, lasers and the Internet. Unfortunately, other parts of the military endeavor have weakened the capacity of industry to efficiently produce, support and market the same technologies by in effect competing with private companies for work. This report

has detailed how the military's vast network of public shipyards, depots, arsenals and logistics centers increases federal costs, fractures product life cycles, diminishes economies of scale, undercuts trade competitiveness, and discourages innovation.

The government needs to recast the relationship between its organic industrial activities and free enterprise, with an eye to making the two sectors partners rather than competitors. That will not be an easy thing to do with defense spending in decline, because the natural inclination of each side will be to secure as much work as possible as a hedge against future uncertainty. But it is precisely because such behavior is becoming more prevalent that policymakers need to restrain the expansion of public sector industrial activity and channel as much work as possible to private companies. Those companies are innovators and exporters in a way that government depots can never be, and their ability to remain competitive in a global economy will be bolstered by maximizing the amount of industrial business they receive from the federal government. Federally owned facilities will never disappear, but they need to be treated as a last resort source of sustainment rather than the preferred source, because America's industrial companies are in a race for survival, and a second rate economy cannot support a world class military posture.

Front Cover: The lead vessel in the Navy's Virginia-class submarine program, under construction at the General Dynamics shipyard in Groton, Connecticut. (Image: General Dynamics)

Back Cover: The Lima Army Tank Plant in Ohio, where prime contractor General Dynamics assembles, upgrades and refurbishes the Abrams tank. (Image: General Dynamics)

“DoD operates 17 major depot activities, employing more than 77,000 personnel and expending more than 98 million direct labor hours (DLHs) annually... The property, plant, and equipment of DoD’s depots are valued at more than \$48 billion. That infrastructure comprises more than 5,600 buildings and structures, with 166 million square feet used for depot maintenance.”

- Logistics Management Institute Depot Maintenance Report, 2011



The Portsmouth Naval Shipyard in Kittery, Maine. (Image: NAVSEA)

“...when wartime operations in the Republic of Iraq and the Islamic Republic of Afghanistan cease, and supplemental appropriations for depot related maintenance are reduced, DoD depots must not return to the post-Cold War environment where public- and private-sector facilities fought for limited available workload to the detriment of both.”

- National Defense Authorization Act for Fiscal Year 2009 Report Language



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