This is due, in part, to Japan's and the PRC's different expectations of their armed forces' missions and roles. As a result, cutting-edge technological capabilities within their defense establishments are accorded lower priority than they are in the U.S. military.

The PRC simply does not have the wherewithal to provide the PLA with cutting-edge technology, either in terms of the necessary scientific and technological expertise or the financial resources to support it. Indeed, Chinese resources are strained simply by the effort to mechanize and standardize their current force structure. Instead, the Chinese military has shown a propensity to rely upon available technologies, within both the CTIB and the DTIB, to fulfill military missions.

The Japanese have chosen to emphasize, as noted previously, development of dual-use technologies, rather than militarily specialized ones. Purely military research offers limited market potential. Furthermore, Japan restricts the sale of weapons abroad; it prohibits sales of completed weapons and allows weapons technology to be sold only to the United States. Purely military technologies have, for the most part, a market comprising solely the SDF. The Japanese appear content, instead, to develop technologies that, although perhaps oriented toward military missions, will nonetheless also have commercial applications.

Whether or not Japanese national security has necessarily been served by such a policy remains to be seen, however. Japanese weapons have not been tested in combat since World War II.

Emphasis on Military Performance

Neither Japan nor China has introduced military technology that is significantly more advanced than its commercial technology. Until the 1980s, for the PRC, this was a doctrinal issue, with "red" and its emphasis on simple weapons in vast quantities taking precedent over "expert" and its emphasis on sophisticated weapons. As the PRC tilts toward "expert," it has become evident that the Chinese DTIB, as currently constituted, is not capable of producing cutting-edge weapon systems. Where the PLA emphasizes performance over costs, this has generally involved the acquisition from abroad of technologies—both military and nonmilitary—that are more advanced than those within the Chinese DTIB.

Japan, on the other hand, has a national technology base that is fully capable of producing very advanced systems and components. Rarely, however, are such systems demanded solely for military production. Indeed, both the Japanese defense procurement system and Japanese corporations are oriented toward the commercial exploitation of advanced technologies, including those that might be developed for military purposes. Where cutting-edge performance is demanded, it is sometimes for the sake of developing dual-use technologies and skills. As with militarily unique technologies, however, it is unclear, at best, how well the Japanese Self-Defense Forces would fare in any confrontation.

RELEVANCE OF THE CHINESE AND JAPANESE EXPERIENCES TO THE UNITED STATES

In light of the differences between the Chinese, Japanese, and American cases in their defense acquisition structures and degrees of integration between their DTIBs and CTIBs, the potential for direct application of Asian experiences to the American situation is limited. Nonetheless, some observations are possible. For example, the absence in Japan of the extensive use of military specifications and standards that have marked the American DTIB suggests that **a reliance on high-quality production from the commercial sector is possible**.

The Asian cases also suggest that greater integration of the research, development, and manufacturing of defense and commercial goods is possible. In particular, **the more fundamental the technology, the easier it is to integrate**. The Chinese appear to have generally succeeded at their attempts at integration because they have been integrating low-level technology (and because of enormous demand).

The Japanese experience reinforces the observation made in the U.S. base that it is easier to integrate the manufacturing of components and subcomponents (e.g., composites and computer chips) than it is to integrate the assembly of systems (e.g., commercial and high-performance aircraft). Manufacturing components and subsystems would, therefore, seem to be very amenable to integration where artificial barriers are not imposed between commercial and military production.

Along these lines, too, the **more basic processes may be more amenable to integration**. This involves not only the production of components, but also their initial design. It is evidently possible to exploit the common backgrounds and training among designers and engineers for both commercial and military ends. With this in mind, the design as well as the assembly of even technologically advanced military equipment might be integratable with commercial counterparts if accounting rules allowed such measures. This amenability to integration is likely to be most successful at dual-use production facilities. The Japanese case suggests that there are few inherent reasons that dual-use equipment, embodying technologies common to both the DTIB and the CTIB, could not be produced on a single production line and assembled, or even simply inspected, on separate lines in light of the different quality-assurance requirements. Such integration, however, presumes that commercial-quality standards are sufficient to support military requirements. Thus, an implicit lesson is that integration demands stringent degrees of quality control, regardless of the end user.

Both Asian states are clearly interested in integration at the workbench level, that is, in integrating their commercial and defense research efforts. This would appear to be a logical pursuit because the results of research efforts, both defense and commercial, might benefit both commercial and defense efforts. Moreover, it allows more efficient use of scarce, and usually expensive, personnel, equipment, and facilities.

The Japanese case suggests that **there are many component technologies and processes that are not truly militarily unique**. Too often, militarily unique technologies are cited as a reason for military specifications, and military specifications are considered necessary for the production of militarily unique technologies. However, as seen in Japan and the PRC, regardless of the level of technological sophistication, many technologies, particularly those at the lower tiers, have dual-use potential. In addition, it is not necessary to organize or manage production of such components differently for commercial and military end users. Were performance specifications (i.e., those relating to form, fit, and function) to predominate, rather than manufacturing and other specifications detailing how an item is to be manufactured and assembled, it is likely that there would be far fewer militarily unique technologies at the lower tiers.

Militarily unique technologies certainly do exist. Those related to the design, development, and production of weapons of mass destruction, for example, are almost certainly militarily unique. Similarly, there may be some technologies (e.g., those behind radar-absorbent materials and electronic-warfare programming) whose dissemination to the CTIB might be detrimental to national security. These would tend to be the exception, rather than the rule, however.

Finally, both Asian cases indicate that **CMI is not cost-free**. Although the Chinese and Japanese economies are more integrated than the American economy, this is achieved at a price. In particular, there are questions about the quality of the weapons produced by both the Japanese and Chinese DTIBs. There is reason to suspect, at least, that American equipment performs better than either their Chinese or Japanese counterparts. The extent to which the high quality of American equipment

is due to the structure of the American DTIB, and whether the same level of quality could be maintained in an integrated environment, is unclear.[103]

The Chinese and Japanese structures of government-industrial relations are very different from that of the United States. Replicating in the United States the degree of integration in the PRC or Japan would probably impose political and economic costs that are absent, minimal, or acceptable in the PRC and Japan but that would not be acceptable in the United States. In particular, it is unlikely that the American system would support the ambiguity inherent in the commercial use of public facilities and, more importantly, of public resources. The slighting of socioeconomic goals would also be unlikely to be acceptable to Americans.

[103] U.S. Congress, Office of Technology Assessment, *Assessing the Potential for Civil-Military Integration: Technologies, Processes, and Practices*, op.cit., footnote 1, especially ch. 2.