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**Producing Defense:
Reinterpreting Civil-
Military Relations
in India**

Itty Abraham

Department of Political Science
University of Illinois at Urbana-Champaign

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Introduction

This paper provides a historical assessment of the state of defense production in India. It also sheds new light on the issue of the state monopoly on defense production, or to put it more provocatively, the production of national security in India.¹ Examining the nature of the complex relationship between the private sector and the state is a core concern for scholars of Indian political economy. Since state autonomy in the defense sector is rarely questioned, my hypothesis is that situating defense production in the context of the overall political economy of state-society relations in India provides a rich source of data with which the relative autonomy of the Indian state may be better understood. The study also argues for a broader definition of the security complex than is common: along with the ordnance factories and defense research labs, the state-owned corporations that fall under the Ministry of Defense are also examined. Finally, this study must be seen in the context of the ongoing concern about the changing nature of India's interaction with the international system, whether characterized as an attempt to change its position in the power hierarchy of states, or its movement toward a more embedded and dependent economic position in the world economic system. Examination of a variety of economic, political, technological and military issues in historical perspective helps to situate our understanding of the present moment more clearly.

Pre-Colonial Production of Weapons (— 1757)

It is common to assert that the recorded history of the world is inseparable from the production of lethal weapons. As the chronicles of its past tell us, India is no exception to this trend. Weapons described in the epics, especially those obtained at great personal effort by heroes and villains alike, are devastating in destructive potential, unerring in use and invulnerable to enemy attack. In short, they sound remarkably like some of the more fanciful creations of devoted supporters of the present day Strategic Defence Initiative.²

Those weapons aside, there is still controversy among historians over the origins of modern weapons production in India. The traditional view is based on the absence of the technical knowledge of iron casting,³ and it implies that modern weaponry like cannon and matchlocks were introduced into India by Europeans in the latter half of the 15th century. This view is correct insofar that in 1666 the Mughal emperors requested the English and the Dutch to recruit “five gunfounders and two engineers or pioneers . . . [who were to be] very experienced practical men.”⁴ However, as Iqtidar Alam Khan points out, as early as the second quarter of the 13th century, “the Mongol armies operating on the northwest frontier of the Delhi Sultanate were already using . . . some kind of gunpowder devices.”⁵ He goes on to show that the use of explosives in siege warfare was not uncommon and that while its practice was not fully developed, the people of northwest India seemed familiar “with the devastating nature” of gunpowder-based explosives.⁶

¹ A typical example is the following quotation: “In the realm of foreign policy the relative autonomy of the state from domestic class dispositions and tensions is, in ‘ordinary times’ seen most clearly.” While foreign policy does not reduce to defense production, the implication of autonomy in the sphere of inter/national security issues is, I think clear. Vanaik’s thought-provoking work is also one of the few books on the political economy of Indian development which even considers the external sphere seriously and with the complexity it deserves. Achin Vanaik, *The Painful Transition: Bourgeois Democracy in India* (London and New York: Verso, 1990), p. 2.

² In fact it has been semi-facetiously argued that nuclear weapons were used in the great war that climaxes the epic *Mahabharatha*. This belief emerges from descriptions of the effects of certain divine weapons which killed thousands of soldiers.

³ This view is most recently expressed in Geoffrey Parker, *The Military Revolution: Military Innovation and the rise of the West, 1500-1800* (Cambridge: Cambridge University Press, 1988), p.128-9 ff.

⁴ Irfan Habib, “The Technology and Economy of Mughal India,” *Indian Economic and Social History Review*, 17, 1 (Jan-Mar 1980), p. 20. Habib is quoting from W. Foster, ed., *English Factories in India 1665-67* (Oxford: Oxford University Press, 1908).

⁵ Iqtidar Alam Khan, “Gunpowder Technology in India: A.D. 1250-1500” *Indian Historical Review* 4, 1 (July 1977), p. 24.

⁶ Khan, “Gunpowder,” p. 26.

More interestingly, there is also evidence from a variety of sources that by the fifteenth century an indigenously developed rocket called *ban* was well known. When the British encountered it in the Maratha wars, they described it as “an iron tube of about one foot long and an inch in diameter, fixed to a [bamboo] rod of ten or twelve feet long. The tube being filled with combustible composition, is set fire to and being directed by the hand, flies like an arrow to a distance upwards of 1000 yards.”⁷ The British must have been quite impressed as rockets copying the principle of *ban* (the Congreve rocket) were eventually introduced into the British army in 1806. From the evidence of a Chinese traveller, *ban* was made in Bengal as early as 1406 and was well known enough abroad to be exported.⁸

The inability to cast iron did not mean that there were no locally produced cannon. By the end of the sixteenth century, the Mughal emperor’s gunsmiths were casting bronze and made what was probably one of the largest cannon in existence at the time, the *Malik Maidan*. This enormous gun was thirteen feet four inches long, had a muzzle diameter of five feet, five inches and threw a ball weighing 550 pounds.⁹ Contemporary observers reported, however, that the gun was quite useless in battle due to its lack of mobility and large bore. Greater success was found with muskets and ‘fowling pieces’ though these were probably the less sophisticated matchlocks rather than the flintlocks that were certainly in the possession of the Portuguese by this time.

The shipbuilding industry during the seventeenth century seems to have been largely the province of the Portuguese. While Indian merchant ships were being built, they were deigned for use only in the seas surrounding them. Indian ‘junks’ had large quantities of sail and shallow drafts and were more suited to carrying large amounts of cargo and traversing sandbanks and estuaries. British reports from the seventeenth century suggest that demand for the older ships had declined but that the local shipbuilders were quick to learn the new designs and even improve on them.¹⁰

Defence Production in the Colonial Period (1757-1947)

The oldest existing unit of the modern defense complex is the Bombay Naval Shipyard at the Mazagaon Docks. This shipyard first started repair and building operations in 1735 and is reputed to have built, in 1817, the oldest sail driven warship still active today. First called H.M.S. *Trincomalee*, T.S. *Foudroyant* is now docked at Portsmouth, England, and used as a training ship of the British Royal Navy.¹¹ According to the Ministry of Defence, the first ordnance factory was built in 1801, though it is not clear which factory they refer to.¹² It seems more correct to date the complex from 1818, the year of the founding of the Gun Carriage Factory in Fatehpur.¹³ By 1905 there were thirteen factories, and by 1947, sixteen factories making various defense-related products.¹⁴

7. Khan, “Gunpowder,” p. 27. For another detailed description of *ban*, see Pankaj Kumar Datta, “Technological Aspects of Some Firearms in Mughal India,” in Aniruddha Roy and S. K. Bagchi, eds., *Technology in Ancient and Medieval India* (Delhi: Sundeep Prakashan, 1986), p. 46.

8. Khan, “Gunpowder,” pp. 25-9.

9. Habib, “Technology and Economy,” p. 19. Compare this also to the cannon “Mons Meg,” which was cast for the Duke of Burgundy in 1449. “It was three metres long, weighed 8.5 tons, and hurled a stone shot 500 millimetres in diameter.” Parker, *Military Revolution* p. 7.

10. The ship builders had “grown so expert and masters of their art that here are many Indian vessels that in shape exceed those that come out of England or Holland,” quoted in Tapan Raychauduri, “Non-agricultural Production,” in Tapan Raychauduri and Irfan Habib, eds., *Cambridge Economic History of India*, vol 1, (Cambridge: Cambridge University Press, 1982), p. 293.

11. Satyendra Singh, *Under Two Ensigns: The Indian Navy 1945-1950* (New Delhi: Oxford and IBH Publishing, 1986), p. 17. He adds that the initial success of the yard was established by the first of a “long line of Parsi master-builders,” Lowjee Nusserwanjee Wadia. It is not clear whether the Wadias acquired their skills building warships for the famous Maratha admiral Kahoji Angre or elsewhere.

12. Department of Defence Production, *India’s Defence Production Sector: A Profile*, Ministry of Defence, Government of India, no date (1984?), p. 2

13. S. K. Sen, *Studies in Economic Policy and Development of India 1848-1926*, (Calcutta: Progressive Publishers, 1966), p. 75. Sen’s sources are original documents including the official *24-Parganas District Gazeteer*. Another officially sanctioned work, A. L. Venkatheswaran’s *Defence Organization in India*, (New Delhi: Publications Division, Ministry of Information and Broadcasting, Government of India, 1967), feels the correct year is 1872, the year that a British-built ammunition factory, “[c]ame into operation in its present form.” (p. 291).

14. See the Appendix to this chapter.

Like the development of Indian industry generally, modern defense production would never have taken off except for the two world wars. Till the first war, most of the needs of garrisons and cantonments were supplied from England, and often had to be, due to the lack of an adequate industrial base in India. However, as mentioned above, factories producing guns, shells and gun carriages had been set up in West Bengal, a region relatively more industrialized than the rest of the country. In 1905, the ordnance factories employed 12,958, a figure that was not to change much till 1914.¹⁵ After this war broke out, the Indian Munitions Board was set up (1917) to both expand industrial production and coordinate war-related supply operations. In Morris's view, however, "few of the wartime manufacturing novelties carried much weight."¹⁶

The Second World War definitely gave a boost to the production of armaments and military materials, though the Chatfield Plan had suggested expansion and new investments in the defense production system even before the war began. During the war, the need for an independent weapons producing base in India became apparent due to greater demand and risk. Shipments from England were unreliable and dangerous and Japanese victories in South East Asia suggested the likelihood of the Pacific theater becoming the Indian Ocean theater of war. Under the Rogers Mission in 1940, recommendations were made that led to the creation of eight new factories and a number of expansion projects. Also, overall direction of these factories was transferred from the Royal Ordnance Factories to the newly created Department of Supply under the Government of India.¹⁷

Motivations of Colonial Defense Production

By the late 19th century, India had become, to use an overused phrase, the "jewel" of British imperial holdings, valuable for both the surplus that was extracted from it and for its strategic location vis-a-vis the rest of the Empire. As a result, British efforts at political hegemony in West and South East Asia could be said to be driven by a dual purpose: to protect the approaches to British India and in the process, to seek out new regions for colonial investment. Certainly, the threat perceived by the expansion of Czarist Russia and its much ballyhooed search for a "warm water" port were directly connected to the fear of eventual loss of power in India.

The security of India was ensured via diplomacy in Europe and armed incursions into Afghanistan and Tibet to protect the land approaches. Equally critical was the Royal Navy which controlled seaward access to the sub-continent. But over time, and especially as the Indian Army grew and began to be used as a proxy arm of imperial foreign policy,¹⁸ it became apparent that the former cumbersome system of military supplies, especially, would have to be changed. India itself had to become a source for some of the military material needed for these missions.

British earnings from India had been used for strategic purposes before. The development of the railway network to facilitate the movement of troops had been completely paid for by India, but its inputs had been wholly imported.¹⁹ Funds for the upkeep of the Indian Army and the costs of various imperial expeditionary forces were provided by the colonial government in India. However, with this investment in primary industrial activities which would support the growth of an indigenous weapons industry, the British were creating the elements of an industrial pole which would help lead to the diversification of domestic economic activity in the next fifty years. This strategic need, hence, was the starting point for the movement from producing relatively simple ordnance and ammunition to increased British investment in defense production in India.

The British government did not come to this decision easily. It was finally only as a result of the strong recommendations of R. H. Mahon, an engineer sent out from England, who was actively supported by Major General A. Walker, then Director General of Ordnance, that the decision to develop the production of arms in

¹⁵. Sen, *Studies* p. 75, using House of Commons (UK) sources. This is confirmed by Morris D. Morris, "The Growth of Large-scale Industry to 1947," in Dharma Kumar, ed., *Cambridge Economic History of India* vol. 2, (Cambridge: Cambridge University Press, 1983), p. 599.

¹⁶. Morris, "Growth," p. 600.

¹⁷. Venkateshwaran, *Defence Organization* p. 291 ff.

¹⁸. Parker, *Military Revolution* p. 136.

¹⁹. See Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in the 19th century* (Oxford: Oxford University Press, 1981) and *Tentacles of Power* (Oxford: Oxford University Press, 1988).

India was taken. The first steel bar rolling plant mill was set up in 1896 in the ordnance factory at Cossipore. Walker felt the Cossipore factory should be “self-contained,” for it was “undesirable that India should be absolutely dependent on England for the supply of ammunition.”²⁰ Steel manufactured in Cossipore went largely to other government factories; for example, the ordnance factory at Ishapore, but the effects of the creation of a steel mill influenced the later development of the region by private capital, both Indian and British.

Apart from the needs of war, growing differences in the interests of the Crown, represented by the Secretary of State for India in London, and the Indian government, represented by the Viceroy in Delhi, had become a factor in the relations between metropolis and colony. The Viceroyalty had always chafed at the control of their activities from London and ever since Curzon’s appointment to the Viceregal Palace a degree of independence in the behavior of the Indian government has been noted by scholars.²¹ Protection of industry located in India and even state encouragement of these industries to provide a more self-reliant economic base, was not as unthinkable as in the heyday of more typical relations between England and India.

With the advent of the Second World War the security imperative driving defense investment became even more pronounced. Eight ordnance factories were set up in various locations to produce a variety of war goods. As mentioned earlier, the proximity of India to the eastern theater of war made it critical that these factories provide all or most of the high-use defense equipment needed, i.e., rifles, shells, ammunition, mortars, clothing and food.

The earliest ordnance factories were centered around Calcutta in the east. In the late 19th century, most of British agricultural capital was located in the eastern half of the country, stretching from the indigo plantations of Bihar to the tea gardens of Assam. Merchant capital was based in Calcutta which was not only the seat of political power, but also a port and the original site of British dominance since 1757. Taking these considerations into account and bearing in mind the relatively well-developed infrastructure of the region once the decision to invest was made, locating the early defense factories here was obvious. This area then developed into the first pole of defense and later civilian industrial activity.

From 1939, with the rapid expansion of existing factories and the creation of new ones, a new region emerged as the prime beneficiary of state investment. Rather than worry about the benefits of economic linkages and the costs of haphazard industrial investment, all new factories were simply located in the heartland of the country, as far away from the theater of war as possible.²² In spite of its relatively underdeveloped industrial base, most of the new and translocated units were placed in the area around Kanpur, in the heart of the Gangetic plain.²³

It should be noted, however, that Kanpur did have some advantages. It was close to the new colonial capital, Delhi, but not too close, there was surplus labor that could be employed, it was well connected by rail to the capital and to the eastern regions of the country where, in the case of attack, its munitions and material would be sent.²⁴ Given the new strategic environment, Kanpur was well placed, which must have overridden the high economic costs: after all, keeping costs to a minimum was the factor that drove locational considerations in the pre-First World War era.

It should be added that in a few cases, the choice of location was probably determined by physical factors. For example, the ordnance factories set up in Aruvankadu and Dehra Dun appear to owe their location to firstly,

²⁰ Sen, *Studies* p. 76.

²¹ See, for example, *The India Office*.

²² This lack of concern with macro-economic considerations was possible because the government was, after all, a colonial state. The imperative for the British was the safety and security of the colonial possession, not regional development, though that may have been an unexpected outcome.

²³ See map in Morris, “Growth,” p. 601 on regional patterns of industrialization in 1931.

²⁴ From this early beginning, Kanpur has developed into a huge industrial region, still including a large defense nucleus. It is not clear whether the development potential of state spending sank into the minds of planners at that time, after all, “Keynesianism” (counter-cyclical state spending) as a set of policy guidelines was only just becoming accepted as the new orthodoxy.

the climatic conditions, and secondly, the existence of large military installations nearby.²⁵ Both these sites, the former in the deep south and the latter, northeast of Delhi, are about 5000 feet above sea level and have temperate climates. The environment is dust free and the milder temperatures inhibit the explosive potential of the raw materials. The climate is probably similar to the area around the British factories that served as models for the Indian plants.

Two conclusions may be drawn. First, the need to create new sites of defense production led to the dispersion of state-sponsored industrial nodes away from a single locus. By 1947, Pune and Kanpur as well as existing (West) Bengal sites had developed into larger defense sectors that later specialized in certain production activities. Linkages with nearby industry, the employment created and the infrastructural capital invested made these regions physically more developed than neighboring areas and lowered the cost of investment for later civilian industry.

Second, this investment was an unusual step. The use of state funds to create industry where there was none before, is inherently a developmental policy typical of an independent state seeking to widen its economic base. It is clear that the industrial development of India would reduce British exports of manufactured goods in the long run and provide a precedent that could be used by colonies like Australia to demand their own industries. It should also be remembered that industrial development in India was being encouraged at a time when the virtues of free trade and free markets were tenets of British foreign economic policy, not only in areas of its own hegemony but in South America as well. This policy could only have come about if the longer term security reasons for it were very strong, confirming again how closely British imperial interests were tied to the continued possession of India and its littoral.

Defence Production in Independent India, 1947-1964: Phase I

Immediately after independence in 1947, within their limited capacities, the factories produced goods for the Army that had formerly been imported from Britain. This was a difficult period for them technologically since production in the ordnance factories had been completely dependent on the supply of designs, expertise and some materials from abroad. Hence, replacement of foreign goods implied, as well, a replacement of critical missing components, especially manpower. After 1947 there were only 26 Indians of gazetted rank in the ordnance services compared to 79 Europeans. In response, between 1948-49 and 1953-54, 75 Indians were sent to various locations in Europe and the US for training.²⁶ After a short period when the ordnance factories had substituted all the defense goods they were capable of, they turned to the civilian market to continue import substitution.

Attempts were made to streamline the ordnance factory system, most notably the Committee under Defence Minister Baldev Singh in January 1954, which led to the formation of the Defence Production Board and three supporting committees in November 1955. The function of the committee was “to report on the working of the Ordnance Factories and, in particular, the possibility of utilizing the idle capacity of the factory *for producing items of civilian consumption.*”²⁷

It should be noted that during this period of institutional decline of domestic weapons production, the armed services were not suffering for lack of equipment. In the 1950s, the amount of weapons imported, especially by the Air Force and Navy, increased tremendously.²⁸ These weapons purchases were not a response to new threats to national security. By and large, they replaced worn out and obsolescent equipment dating from the war and filled the gaps in the arsenals of the services. Since, during the world war, Indian armed forces had been subordinate to the overall strategic plans of the Allied powers, this had led to a force profile that was only complete within the larger structure. Hence, some of the arms purchases of this period were simply to replace

²⁵. Aruvankadu is a few miles from the regimental headquarters of the Madras Regiment (Wellington) while Dehra Dun is the site of, most notably, the (then Royal) Indian Military Academy.

²⁶. Venkateshwaran, *Defence Organization* p. 294.

²⁷. Venkateshwaran, *Defence Organization* p. 297, emphasis added.

²⁸. For a list of the imported systems, see Andy Lee Ross, “Security and Self-Reliance: Military Dependence and Conventional Arms Production in the Developing World,” (Ph. D. diss., Cornell University, 1984), and Raju G.C. Thomas, *The Defence of India: A Budgetary Analysis* (Columbia, MI: South Asia Books, 1979).

missing systems that had formerly been maintained by the British and the US. Not surprisingly, these missing systems were mostly technologically sophisticated weapons that could not be manufactured in India at this time, i.e., aeroplanes, tanks and naval surface ships.

Through the 1950's, for those within the defense sector, the problem was perceived as follows. While a number of production units for the production of lethal equipment did exist under the aegis of the state, they were inadequate and functionally fragmented. As an early Defence Secretary put it, these factories had been set up "to meet ad hoc requirements" and largely to serve only the needs of the Army.²⁹ In this period, however, defense production policy was centered around organizational change with the idea of making the system more efficient rather than increasing its size. As mentioned above, governmental concern with the ordnance factories led to the reorganization of management and control via the formation of the Defence Production Board and its three supporting committees. While there were steps taken to increase the complexity of the output of the defense production sector, these steps hardly suggest a concerted and coherent state policy as was desired by some defense bureaucrats.

On the one hand, recognition of the need to construct units producing vital inputs for a defense production sector led to the formation of Bharat Electronics Limited (1954), a public sector corporation under the Ministry of Defence which was "to design, develop and progressively manufacture electronic equipment such as transmitters, transreceivers . . . and to undertake the manufacture of specialized and electronic components."³⁰ Another important new facility was the Machine Tools Prototype factory at Ambarnath. Finally, a decision was made in 1959 to ignore private sector capabilities in automobile production and to begin the licensed production of trucks, jeeps, and earth moving equipment within the defense sector.

On the other hand, an existing state owned corporation, Praga Tools Limited, was also included under the Ministry of Defence. The reason was literally because "someone thought it might make certain parts for carbines used by our defense forces." This company had first been run by the state government of Andhra Pradesh, then taken over as a "sick" unit by the Union Ministry of Industries. Perhaps not surprisingly, the attempt at reviving an industrial unit under the protected conditions of the Ministry of Defence was so successful that "in fact, it was able to declare a dividend for the first time in its history."³¹ The success of the presumed overarching goal of efficient and modern defense production, however, goes unrecorded.

Also suggesting the haphazard state of defense production policy during this period (1956) was the attempt to build an indigenous supersonic aircraft at the state aircraft manufacturer, Hindustan Aeronautics Limited (HAL). While utilizing foreign design expertise, the scale and scope of this project was far beyond indigenous capabilities at this time and suffered as well the basic problem of the lack of a suitable power plant. At this time, quite independently of its aircraft business, HAL was also making rail coaches for the civil sector.

Factors Impinging on Defense Production in this Period

In the early post-independence period, the production of arms declined in importance as a priority of state activity. Various commissions were set up to examine defense science (the Blackett Report), streamline the industry (Baldev Singh Committee), and develop atomic energy (1948); but on the whole, state investment in domestic production of defense equipment was low.

The prevailing view was that while having an indigenous defense industry was important for an independent state in India, its social cost was not justified. There were more important development issues at stake that, in turn, meant strictly economic development. This was the time of debates about the respective virtues of balanced and unbalanced growth, planned versus unplanned economies, mixed versus free market systems and

²⁹. Venkateshwaran, *Defence Organization* p. 297.

³⁰. *Third Report*, Committee on Public Undertakings, Fifth Lok Sabha, (1971-72), Lok Sabha Secretariat, New Delhi, p. 2. A number of collaboration agreements with foreign firms were signed, most importantly with CSF (now CSF-Thomson) of France.

³¹. H. C. Sarin, in Press Institute of India, ed., *Defence of India*, (New Delhi: Vikas Publications, 1967), p. 52.

other variations in economic strategy; but in any case the lack of modern, industrial capital was perceived to be the central issue of underdevelopment.³²

While hoping security concerns could be kept at bay by a combination of diplomacy and weapons imports, although the need for defense was clear, scarce domestic capital would be used for economic development. With regard to the latter, Indian policy makers became aware that it was always easier to get credit for weapons purchases even when loans for civilian development were not always available. In their minds, arms were still an *instrument* of security: this external dependence was abhorrent but less important because of the privileging of other means, i.e., diplomatic instruments, over conventional military security measures.³³ The centrality of this tradeoff in state security policy cannot be separated from the views of the first Indian Prime Minister, Jawaharlal Nehru.

This is not the place to go into Nehru's formative influences: many biographies and critical works do this in great depth, controversy and clarity.³⁴ Whatever these influences were, Nehru's beliefs in the 1950s seem quite clear in one respect. There was an absolute opposition between purely defense-related issues and civilian development but not between overall national security and development. This ideology of national security, which may be now coming back into vogue,³⁵ sees the security of the state as ultimately dependent on the industrial capabilities or strength of the economy: the crucial variable, hence, is economic development, rather than the amount of weapons or arms possessed by the armed forces since these can always be produced by an industrially diversified and developed state. However, in the short run, while the vital industrial base of the country was being strengthened, diplomacy was critical in keeping the country secure. These views are so fully expressed in a speech during the presentation of the defense budget to the Lok Sabha in 1956, that I present a rather lengthy excerpt:

The hon Member who spoke just before me asked us to give (the armed forces) the latest equipment, best training and all that. What exactly does that mean? In nothing, I think, has there been such a rapid, such a great improvement in technology as in defense or in . . . war technology. Of course the latest example of that—the final example—is nuclear weapons, atomic bomb or hydrogen bomb. That is the final culmination of this process up till now. If you judge from that, it simply means this, that no country in the world, practically speaking, excepting the two great powers [are] adequately defended, because only they have enough of these nuclear weapons . . . How, then, does one judge this adequacy of defense of a country? . . .

What is the equation of defense? In what lies the strength of a people for defense? Well, one thinks immediately about defense forces, army, navy, air force. Perfectly right. They are the spear points of defense . . . How do they exist? What are they based on? The more technical you get, as armies and navies and air forces are getting, *the base is the industrial and technological development of the country* . . . Therefore, apart from the [armed forces] you want an industrial and technological background in the country. *Because if the country's economy is not sound, the country, in fact, is not a relatively prosperous country [—] so far as its economy and people are concerned, it is a weak country* . . .

I have often said that the real answer to the atomic bomb lies in other spheres. I mention this because in the final analysis what counts is not your soldier or your military weapon, but the spirit of unity of the people; the will of the people to survive in spite of every difficulty and every menace . . . So the

³². The opposing sides in the “underdevelopment” debate in the 1950s received their most extreme statements from Albert Hirschman and Rodenstein-Rodan on the unbalanced hand, and Ragnar Nurske on the side of balanced growth. Both parties, however, took as central to the problem the conclusions of the Harrod-Domar model of macroeconomic growth—more capital created more development. Ragnar Nurske, *Problems of Capital Formation in Underdeveloped Countries* (New York: Oxford University Press, 1953); Albert Hirschman, *The Strategy of Economic Development* (New Haven: Yale University Press, 1958).

³³. It is interesting to note that in these earlier, simpler times, the separation of the instrumental and final value of weapons was very clear. It is only with the internalization of the principle of deterrence that this distinction becomes blurred and the possession of (nuclear) weapons itself is an end. For example, the classic Clausewitzian dictum defining war only in the context of overall foreign policy presupposes purely conventional weapons.

³⁴. S. Gopal, Michael Brecher, *Nehru: A Political Biography* (London, 1959), R. K. Karanjia, *The Mind of Mr. Nehru: An Interview* (London, 1960).

³⁵. For a recent exposition, see the papers presented at *Development Dynamics: Security and Political Considerations*, an international conference held at the Bangladesh International Institute for Strategic Studies, Dhaka, Dec. 12-14, 1989

equation of defense is your defense forces plus your industrial and technological background . . . thirdly the economy of the country and fourthly the spirit of the people.

An hon. Member, I am told, said here: “What is the good of your Five Year Plans? You must concentrate on defense.” That is a grave statement to make. But the Five Year Plans [are] the defense plan of the country. What else is it? because defense does not consist of people going about marching up and down the road with guns and other weapons. [Security exists] *today in a country which is industrially prepared for defense, which can produce the goods, the equipment.* Therefore the right approach to defense is—well, one obvious approach, of course, is friendly relations with other countries to avoid having unfriendly relations which might lead to conflict . . . But any kind of blustering attitude [in foreign affairs] is neither becoming to a dignified nation, nor is it safe, nor is it appreciated by anyone in the world. It is a sign of weakness not strength. Therefore we must cultivate friendly relations, and we must cultivate and spread the feeling that no subject, no quarrel is big enough for war to be required to settle it, or to put it differently, that war today is, and ought to be, out of the question.³⁶

In practice, the interpretation of these views led to the development of a stark dichotomy between civilian and defense production. In the perception of state managers and political elites, the ordnance factories, especially, were seen as a net drain on the economy. Appearing overstaffed and underproductive, they take funds away from directly productive development activity. Hence, with little else to justify their existence, the obvious decision was to turn ordnance factory output towards the civilian market to keep the factories active and labor employed. The motivation, unlike most investment in the non-defense public sector which was for infrastructure development, was ultimately to ensure their own survival. Positive balance sheets and visible products helped reduce the overall criticism as well as appeared to further the industrial policy of import-substituting industrialization (ISI).

From the late 1950s, a new vitalism emerged in the Defence Ministry due to the newly appointed Minister of Defence, V.K. Krishna Menon.³⁷ Krishna Menon’s contribution to the formation of the security complex was the first well formulated and committed operationalization of the rhetorical goal of self-sufficiency in defense production. His gamble was to try and achieve increased indigenous defense production *and* affirm the social value of added spending on the armed forces, visibly and with full responsibility for failure. The following comments by a high ranking and retired bureaucrat and air force chief, respectively, are typical of Menon’s impact. “With the arrival of Mr. Krishna Menon in the scene, there was an immediate change [in the way the Ministry was run]”³⁸ and “but for Krishna Menon I doubt whether anything would have been done to increase the supply of Indian-made arms and equipment to our services.”³⁹ But the gamble did not quite pay off. As one observer put it:

There can be no doubt about it, that for the first time since Independence, the defense apparatus of the nation was receiving the attention and direction it needed, from the new Minister of Defence; the fatal

³⁶. Jawaharlal Nehru, excerpted from *Lok Sabha Debates* Part 2, 12th Session, volume 2, 5-23 March (1956), pp. 3270-3274. Emphases added

³⁷. Krishna Menon was an unusual figure in the world of Indian politics. He had lived in England for over twenty years during the colonial period and was deeply involved in a number of activities, including giving nationalist Indian views a voice in England, in local community politics and publishing. He even served as a councilman for a number of years. He then served as India’s first High Commissioner to England after 1947, at the time the most important diplomatic post for the country. After returning to India in the mid-50s, and already in the public eye due to the so-called ‘jeep scandal,’ the protection that he received from Nehru could have had a part in developing the intense hatred he aroused in many others. At a time when the sycophancy around political leaders was already beginning to be institutionalized, Menon’s distinct and strident voice could always be heard, saying exactly what he felt and why. He was seen as so close to Nehru that criticism of him could be construed as criticism of Nehru which made him a dangerous person to cross. A detailed analysis of his beliefs may be found in Michael Brecher’s discussions with him, *Krishna Menon*. There is a sympathetic biography by T. J. George, *Krishna Menon*. The jeep scandal is fully covered in Surendranath Dwivedy and G. S. Bhargava, *Political Corruption in India* (Delhi: Popular Book Services, 1967), pp. 43-62

³⁸. P. V. R. Rao, *India’s Defence Policy and Organization since Independence* USI National Security Lectures, United Service Institution of India.

³⁹. P. C. Lal, *My Years with the IAF* (Delhi: Lancers Publishers, 1986), p. 25.

weakness in the situation lay in the fact that there was simply not enough political support and backing behind the Defence Minister.⁴⁰

This lack of broad based support for Menon's policies seemed to be motivated, above all, by a dislike of the person and his style, so much so that his closeness to Nehru could not save him. After the fateful war with China in 1962, the responsibility for the failure of the Army fell on his shoulders and he was forced to resign.

Krishna Menon's reforms were aimed at centralizing and rationalizing decisionmaking about defense production. At the organizational level the Defence Production Board was revamped and renamed. The new Defence Minister's Production Committee expanded its membership and functions and concentrated administrative power in one body directly under full ministerial control.⁴¹ A number of existing committees and panels were dissolved or reconstituted making this Board the primary administrative organ for overseeing the entire defense complex.

The associated committees had clearly defined and separate functions. The Defence Production Advisory Committee was to interact with the private sector to examine possibilities of cooperation and to ensure non-duplication of productive capacity. The Defence Production and Supply Committee was committed to indigenization of imported stores (import substitution) and to making the stores allocation and distribution process more efficient. The Defence Research and Development Committee was to advance and coordinate defense-related research underway in the armed forces and scientific establishments.

More than material achievements during his tenure, and apart from his organizational changes, what was given form and would sharply modify the beliefs of the civilian defense bureaucracy from this point onward was the imperative of self-reliance. What this translated to in practice was not always clear: in the 1950s, self reliance was taken solely to mean import substitution. This policy was not helped by an uneasy cohabitation with a private sector that wanted to ensure the state did not compete with the civilian economy and the armed forces that wanted the latest equipment from abroad, preferably from the United States or Britain. Finally, Defence Ministry units still had to appear efficient and in the larger public interest. Krishna Menon's defense of his budget in the Lok Sabha (1961) suggests all these factors:

Thanks to the decision by the government to go more and more into indigenous production whereby it is possible for us to improve on what other people have made and what is more, to be able to make things for ourselves . . . When I come to the figures of foreign exchange [savings], in 1957-58 . . . stores from abroad were Rs. 93.57 crores but in 1961-62 it came down to Rs. 44.84 crores . . . Bharat Electronics came in quite rightly for a considerable amount of criticism. Two aspects of this question have been raised. One is, why should this be a defense factory? Well, it was started seven years ago as a defense factory because the defense people were expected to be the largest users of electronic instruments and what is more there are certain products under secret list with the Defence Ministry which have to be manufactured there. But Bharat Electronics works also for the Railway Ministry, the Home Ministry, the Transport Ministry and everybody else.⁴²

It turned out what was needed for a concerted effort in self-reliance first, to begin, and second, to expand in definition, was military disaster. "Real" domestic weapons production was set into motion only after the 1962 war with China, and even more so, after the 1965 war with Pakistan, when the United Kingdom and the United States placed an embargo on defense equipment to the sub-continent.

To quickly summarize, in the immediate post-independence period, a limited amount of defense production in India was carried out in the ordnance factories inherited from colonial rule. Efforts at indigenization took the form of upgrading machinery and equipment to provide domestic substitutes for imports and to expand the production of low value items like small arms, ammunition, clothing and so on. Import substitution took the

40. S. S. Khera, *India's Defence Problem* (New Delhi: Orient Longman's, 1968), p. 219.

41. It had formerly been chaired by the Minister of Defence Organization, a junior Cabinet position.

42. Krishna Menon, excerpted from *Lok Sabha Debates* 13th Session, 2nd series, vol. 54, April 11-21, (1961).

form of replacing some forms of external dependence, especially with regard to personnel. By the end of the decade, the ordnance factories were also producing, on license, wheeled vehicles like trucks and earth movers.

Defence Production as Core State Activity, 1964-1989: Phase II

The Ministry of Defence *Annual Report* of 1964-65 heralded the changes that were put into practice that year as a result of the China war. For the first time there was to be a defense plan to be implemented over a period of five years. The plan included “strengthening the defense production base to eventually meet the requirements of arms and ammunition . . . and improving the fields of procurement, storage, training, etc.”⁴³

Many changes were made in the period immediately following this policy shift. New defense public sector corporations were set up and old ones expanded. HAL’s railway coach fabrication division was separated from the aircraft manufacturing unit and combined with an earth moving division to form Bharat Earth Movers Limited (BEML). BEML made its first sales in 1964-65. The government entered into a production agreement with the USSR to make Mig-21s in India. HAL was given the overall responsibility for production and new plants were set up in Koraput and Nasik. An existing facility in Hyderabad was modified as well to produce aviation electronics.

The Electronic Committee, or Bhabha Committee, issued its report in 1966 which outlined the steps needed to create a self-contained electronics industry in India. This led to the formation of the Electronics Corporation of India Limited (ECIL) which came into production a year later. The *Vijayanta* tank project, the manufacture on license of a modified British Vickers tank, was set up in Avadi, near Madras, at the Heavy Vehicles Factory. With the addition of a dedicated R&D unit, the Combat Vehicles Research and Development Establishment (CVRDE), this facility has since become the core of the Main Battle Tank (MBT) development project of the late 1980s and 1990s.

The late 1960s saw the incorporation of the Goa Shipyards Limited (GSL) as a Defense Production State Undertaking (DPSU). This existing unit was taken over by the government in 1963 and initially managed by Mazagaon Docks, but has since acquired more autonomy. Projects to manufacture machine tools and engineering goods were taken up by the Garden Reach Shipyards and Engineers (GRSE) in Ranchi and Calcutta. Bharat Dynamics went on-stream in 1971-72. This unit is the dedicated producer of guided missiles. Its first project was an agreement with Aerospatiale of France to manufacture first generation guided anti-tank missiles. The next agreement was signed with M/s Euromissile for the production of second generation missiles. The most recently created unit is Mishra Dhatu Nigam (Midhani), which began production of specialized metals and alloys in 1981-82. These non-ferrous alloys are used in the manufacture of aircraft, especially Soviet aircraft, and by the Department of Space. Midhani’s other clients include the defense research establishment and the nuclear power stations.

Fiscal Dimensions of State Action

The objectives of examining this data are to get an idea of the size of the complex and to study the rates of growth, periods of investment and changes over time in the defense sub-complex in the last forty years.⁴⁴

⁴³. *Annual Report 1964-65*, Ministry of Defence, Govt. of India, p. 2.

⁴⁴. The data provided here are all from official sources. This has its own problems as the Indian state has always been particularly reticent about releasing detailed figures about the armed forces and defense sector. The democratic process, however, requires the defense budget to be presented annually in Parliament where it should be discussed and approved.

The Defence Service Estimates, as the defense budget figures are called, are the most commonly used empirical data source by security analysts. They are divided into the amounts requested for capital investment and for revenue expenditure. The latter amount, revenue expenditure, are divided by service and include figures on salaries, pensions, works and maintenance and military farms and other ongoing costs, but also on the DRDO and ordnance factories. The last two items have been extracted from the revenue expenditure data for this analysis. The capital expenditure figures, which really determine the scale of the revenue figures, are of more interest to us here, and are being presented under the heads of the three services.

For the state owned corporations, whether formally under the Defence Ministry or other state organs, fairly detailed financial information can be culled from the annual reports of the Bureau of Public Enterprises (*Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government*). This Bureau, which is charged with

Examining the macroeconomic data on state expenditures and defense output affirms the validity of the period 1962 to 1966 as the “take-off point” for the Indian defense production sector. This data also suggests two phases of a concerted state policy of weapons production and related scientific-industrial activity. 1962-80 marks the first period of secular increases in spending and resources devoted to this sector, and 1980 to the present, the next.⁴⁵

Expenditures on ordnance factories went up threefold (adjusted for inflation) in the period between the early 1960s and the present. Considering the entire security complex, the increase in capital employed is quite remarkable.

Table 1. Capital Employed in State-Owned Defense Corporations (Rs. Lakhs* in 1960 prices: Selected Years)

<i>Year</i>	<i>Capital</i>	<i>Average</i>
1962-3	3,755.21	751.04
1963-4	4,566.97	913.39
1964-5	5,843.36	973.89
1965-6	7,481.45	1,246.91
1966-7	10,122.07	1,687.01
1980-1	287,357.47	31,928.61
1981-2	429,369.31	42,936.93
1982-3	561,945.24	56,194.52
1983-4	739,716.05	73,971.61
1984-5	890,849.05	89,084.91

*Rs. 1 Lakh is Rs. 100,000

Source: *Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government*, Bureau of Public Enterprises, Ministry of Finance, Government of India, various issues.

The following features of the tables presented here should be noted. First, capital employed in the so-called production units (the state owned enterprises) have gone from Rs. 375.5 million in 1962-63 to Rs. 89.085 billion (\$7.2 billion) in 1984-85, adjusted for inflation. This statistic excludes the capital investment in the military itself and the ordnance factories. If we include these figures as well, total state investment in 1984-85 was Rs. 197.4 billion (\$15.9 billion), at 1960 prices. In the same period, sales of these public sector firms have gone from Rs. 211.6 million to Rs. 89.067 billion (\$7.2 billion) and profits have gone from Rs. 16.38 million to Rs. 3.7 billion (\$300 million).

overseeing the operations of state corporations and reporting the results to Parliament, is now under the aegis of the Ministry of Industry having been transferred from the Ministry of Finance. The advantage of using this source, as opposed to corporate annual reports is, firstly, the ease of collection of the data and secondly the comparability of the data collected. For more detailed case studies, however, there would be no substitute for using the actual balance sheets of the relevant state corporations. Also of use for more detailed studies are the *Reports* of the Parliament’s Committee on Public Undertakings which, while it provides little financial data, every few years examines in some detail the working of these firms and gets the responses of management to their questions and comments.

⁴⁵. In attempting to regress the data on state expenditure against time, exponential functions were found to fit better from 1962-1987 and linear functions for data from 1962 to 1979-80. These results are not conclusive statistically because of the paucity of data points.

Table 2: Capital Outlay: Ordnance Factories and Total Armed Services (Rs. Lakhs in 1960 prices: Selected Years)

<i>Year</i>	<i>Ordnance Factories</i>	<i>Total</i>
1962-63	6,736.8	12,578.95
1963-64	12,551.81	24,630.11
1964-65	11,564.58	27,169.30
1965-66	12,657.52	32,387.88
1966-67	14,869.99	34,561.47
1967-68	20,756.18	41,403.63
1968-69	21,618.03	43,128.90
1969-70	20,543.10	46,880.49
1980-81	273,769.04	451,764.31
1981-82	355,258.75	638,049.34
1982-83	393,674.87	729,410.49
1983-84	454,176.83	898,570.09
1984-85	520,753.54	1,083,304.82
1985-86	660,788.42	1,462,769.12
1986-87	881,502.63	3,317,652.61

Source: *Defence Service Estimates*, various issues

These figures, however, are misleading in some ways. Three firms, Hindustan Aeronautics, Bharat Electronics, and Bharat Earth Movers Limited account for most of the sales and profits of this sector. Of these three, only Hindustan Aeronautics is a truly dedicated supplier to the defense sector, with 90% of BEML's sales and one-third of BEL's sales going to the private or non-defense sectors. The proportion of BEML's sales to the defense sector may be expected to increase, however, as it may become one of the production sites of the new Main Battle Tank project and supply the launch platform for surface to surface missiles.⁴⁶ Of the other firms, Praga Tools, also a large supplier to the civilian market, has recently (1986) been transferred to the Ministry of Industry due to its concentration in this area. The earnings of the three shipyards fluctuate due to inconsistencies in naval procurement policies and the large size of single orders. They have attempted, of late, to diversify and expand their civilian functions in order to remain financially viable as they wait for state orders. The Electronics Corporation of India is also a substantial supplier to the civilian market, especially in consumer electronics. Of the remaining firms, due to the nature of their products, most of the output of Bharat Dynamics (guided missiles) and Midhani (special alloys) goes directly to the military or to the space sector.

In summary, in the traditional defense production sector there are firms that are solely dedicated to the armed forces and defense sector and derive their sole *raison d'être* from them. These include HAL, BDL and Midhani. Then there are firms like BEL and BEML that have specialized qualities that are useful for military purposes but interact far more frequently and perhaps intensely with the civilian market. They represent as well the cream of the state sector in the Indian economy in terms of their earnings and financial stability due to their specialized technologies, access to state subsidies as a result of their defense sector association and aggressive marketing and managerial policies.

The three shipyards are somewhere in between. On the one hand they are holders of specialized technologies for defense purposes but are stymied by the infrequency and irregularity of orders from the Navy. On the other hand, they can equally provide these services to the civilian economy but are restricted from doing so because of the nature of their operations. There is a technological constraint in that there is very little flexibility in the functions of shipyards once a commitment to a certain project has been given and a marketing constraint in that they tend to be passive sellers of services rather than active. In other words, they are in the position of not being able to affect the market for their product relative to the market demand.

⁴⁶ Interview with retired BEML manager, Bangalore, October 27, 1989.

Table 3: Actual Expenditure on Ordnance Factories: Selected Years (Figures in millions of 1985 Rupees)

<i>Year</i>	<i>Outlays</i>
1962-63	3,620.284
1967-68	4,739.355
1971-72	6,031.876
1975-76	7,853.412
1980-81	8,225.594
1986-87	11,381.277

Source: *Defence Service Estimates*, Ministry of Defence, Government of India, various issues

The ordnance factories may be thought of in the following ways. They perform the majority of the import substituting functions that the defense industry was mandated to do in post-independence India, especially for the Army. They produce the uniforms, boots, tents, field kitchens, camouflage nets and other basic equipment for the soldier in the field. They also produce the carbines, explosives, field artillery, shells and other ammunition for the larger guns. They manufacture transport vehicles and jeeps, armored personnel carriers, armored cars and tanks. Most of the capital equipment and machinery that is used to produce this equipment was imported or adapted from existing vintage machinery. They are also the production units for the defense research sector when defense R&D comes up with products that have been accepted by the armed services that are often modifications or improvements of existing systems. For this they have often created an entire new production line with its attendant capital costs. Hence, we see a growth trend in ordnance factory capital expenditures that increases steadily over time, especially in the last fifteen years. This should be interpreted as capital investment due to the exhaustion of the first stage of import substitution (of smaller items and high-use products) and investment due to the growing importance of Defence Research and Development Organization (DRDO) and the greater importance of indigenous technologies in domestic defense production.

We get a further insight into the insignificance of this expenditure by examining total government figures on investment and consumption in the economy. While between 1962-63 and 1968-69 state capital formation in the economy declined in real terms (1985 prices), investment in the DPSUs and armed forces either increased or stayed constant. The same phenomenon occurs between 1979-80 and 1983-84. Overall government investment dropped and yet every indicator of investment in the defense sector showed a remarkable rise. Key moments of transition in the security complex occurred in spite of declining state activity elsewhere. The importance given to this sector cannot be better demonstrated than by this statistic showing a lack of relation to the net availability of resources generally.⁴⁷

Table 4: Defence Production Unit Sales and Central Loans (Rs. Lakhs in 1960 prices: Selected Years)

<i>Year</i>	<i>Sales</i>	<i>Loans</i>
1962-3	2,116.19	526.01
1963-4	2,870.49	916.91
1964-5	3,751.24	680.29
1965-6	5,375.78	1,047.84
1966-7	9,169.69	3,748.59
1967-8	14,872.87	8,206.43
1968-9	19,353.99	10,654.98
1980-1	232,296.40	114,836.06
1981-2	403,164.83	156,344.62
1982-3	527,381.78	189,279.07
1983-4	724,765.10	220,886.76
1984-5	890,672.08	211,183.12

Source: *Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government*, Bureau of Public Enterprises, various issues.

Resources for investment in the defense complex are derived from internal capital formation and also via access to state financial agencies. The pattern appears to be that the largest quotient of state loans are given in

⁴⁷. The opportunity cost of defense investment could also be expressed in terms of the foreign exchange component being utilized and its effect on the domestic cost of capital. This expands the fiscal deficit and has inflationary implications; all these costs are ultimately borne (though differently) by different sectors of civil society.

the most uncertain period for any new firm; namely, the start-up phase and from that point on the ratio of capital employed to government loans steadily increases. Loans are given at below market rates as is standard practice for the long term development financial agencies like the Industrial Development Bank of India (IDBI) or Industrial Finance Corporation of India (IFCI).

After examining Table 4 above and data from individual firms, the pattern of funding suggests state funds appear to be critical at the point of inception of the firm, but the relative amounts of state loans declines with respect to the total capital employed over time. Sales from the defense public sector units increased slowly in the 1960s and then increased rapidly in the 1970s and 1980s. One of the reasons for the remarkable rise in the value of sales seen after 1973, is the higher cost of imported components due to the oil crises. Since most of these firms are near-monopolists and operate on a cost-plus basis, it was possible to pass on most of the increased costs to the final consumer, whether state or private sector.

As in the British period, we get some confirmation of the concerted nature of state behavior by observing the regional effects of expenditure on the security complex. By the beginning of the 1990s, a number of specialized poles of military-industrial activity can be easily observed.⁴⁸ Bangalore (Karnataka), Hyderabad (Andhra Pradesh), Jabalpur (Madhya Pradesh) and Pune (Maharashtra) are the locations most easily defined.

Located in the south, Bangalore is the core of the aircraft and electronics sectors of the complex. While it has always had a sizable military establishment, the city has expanded enormously since 1947 and is now the home of three defense public sector corporations, HAL, BEL, BEML and many R&D labs. Also, giant public sector corporations like BHEL, ITI and HMT have their headquarters here. The private sector, too, has expanded into Bangalore, often moving from traditional locations like West Bengal. One of India's premier research institutions, the Indian Institute of Science, is located here as is one of the Indian Institutes of Management.

Hyderabad too has a number of DRDO labs and other units specializing in electronics, but is better characterized as the space complex along with its supporting ancillary units like special alloys and the nuclear fuel complex. It is the home of the Electronics Corporation of India (ECIL), Midhani, Praga Tools and Bharat Dynamics. Most of the space research and fabrication is located in the ISRO complex. There are defense labs like the Defence Electronics Research Lab (DLRL), two large universities in the city and a prestigious regional engineering college at nearby Warangal.

Jabalpur, in Madhya Pradesh in the heart of the country, is the location for the vehicle and automotive sector. There is a gun carriage factory here where combat vehicles are made, a vehicle factory which produces trucks and jeeps, and an iron foundry to provide industrial inputs. Compared to Bangalore and Hyderabad, it represents the lower end of the technological range, as it specializes in traditional industrial activity and is also a much older segment of the complex (The Gun Carriage Factory dates to 1904).

The fourth pole is Pune in the west, which, apart from the headquarters of the Army's Southern Command is the center of armaments and explosives research and development. Four DRDO labs specializing in the study of these products are located here as are their corresponding production facilities. Kirkee, a nearby town is the site of both a high explosive and ammunition factory. A number of ordnance factories producing munitions are based nearby. Finally, the National Defence Academy, the College of Combat at Mhow and a number of army cantonments are all located in this area.

Since the early defense investment in Kanpur, the city has developed into a large pole of defense activity, though difficult to define in functional terms. Apart from the original ordnance factories that were set up here there is now a small arms factory, field gun factory and clothing factory. There is a further anomaly, a HAL unit. In times of war in the west and north, this region would be considered a vital transshipment point. For the Air Force, Kanpur acts as the central location for maintenance, stores and refurbishment for its Central Air Command. Also, the location of a defense materials and stores lab here suggests that the region is used as a

⁴⁸. For a fuller exposition of the relation between defense spending and regional development in India, see A. P. Elhance, "Spatial Organization of Arms Production in India: Determinants and Impacts," presented at *Western Regional Science Meetings*, Hawaii, Feb. 1990.

major storage site for all kinds of defense materials. Finally, one of the five national institutes of technology is located outside the town of Kanpur.

Madras, apart from being a port and the primary industrial-financial city of south India, is the location of the Heavy Vehicles Factory and its corresponding R&D establishment. It, too, has a large university and an Indian Institute of Technology. Not far from the city is the Kalpakkam Atomic Power Station where considerable nuclear research is conducted.

Falling outside the broad parameters of high technology development in the south and less advanced industrial activity in the heartland Gangetic plain are the defense sector shipyards at Bombay, Goa and Calcutta. Mazagaon Docks and Garden Reach have in-house R&D facilities and large establishments and infrastructure have grown around them. There are naval yards as well in Cochin and Vishakapatnam with supporting DRDO facilities. The latter yards are not production sites primarily but rather specialize in maintenance and refitting since the navy uses these harbors as bases for access to the Arabian Gulf and Bay of Bengal. Stephen Cohen has also suggested that an important component of the factors influencing dispersion is the need to keep production and maintenance facilities from different sources separate.⁴⁹ For instance, Vishakapatnam services vessels derived from the Soviet Union and Bombay and those vessels of Western European origin.

Motivations Behind Patterns of Development

Apart from the motivations influencing the location of the MiG complex in the early 1960s (see below) the logic of state investment seems relatively unchanged from the colonial period. Strategic and efficiency considerations seem to have overridden political and regional developmental desires suggesting again a high degree of autonomy of state action. That the factors driving decisions have changed since the early days of the complex is best seen in the light of the largest defense project of its time since independence, the MiG project of the early 1960s.

In the summer of 1962, the Indian and the Soviet governments signed an agreement to allow the licensed manufacture of MiG-21 aircraft in India. Three plants were needed for the particular technical requirements of the aircraft. These were set up at Nasik (Maharashtra), to manufacture airframes and for final assembly, at Koraput (Orissa), to manufacture engines and at Hyderabad, for the manufacture of electronic equipment. In spite of the fact that the engine and airframe plants had extremely similar requirements, except that the former had to be located in a cool climatic zone, locations 900 miles apart were finally chosen.⁵⁰ According to the Soviet advisors, had a location near Nasik been chosen, the existing infrastructure in the region would have both shortened the time for engine production by six to eight months and been less subject to skilled labor shortages. At the time, Koraput was underdeveloped economically, having neither industry nor sufficient communication links.

There were a number of problems with the site selection. According to the Managing Director of HAL, first, an engine shipped from Koraput to Nasik would take a week, if sent by passenger train.⁵¹ Second, "it is very likely that the sensitive parts of the engine would get damaged during transit by rail and the whole process have to be repeated." Once in operation, when the aircraft needed overhauling the entire process would have to be repeated; the aircraft flown to Nasik, stripped of its engine, the engine sent to Koraput where it would be overhauled and then sent back to Nasik for reassembly. The whole process could easily take a month for a single aircraft. The Managing Director admitted to the Parliament Public Affairs Committee that "it would have been more efficient and economical if both the factories were at one place."⁵²

Two stated reasons for this decision were given. The first was that since the volume of production would be very high at both locations, "the organization would be very unwieldy" and "the establishment of separate

⁴⁹. Private communication, Urbana, IL, October 15, 1990.

⁵⁰. *Eighth Report*, Lok Sabha Committee on Public Undertakings, Fourth Lok Sabha, (1967-8), p. 8.

⁵¹. The delay would be much longer if sent by goods train, as is more likely.

⁵². *Eighth Report*, Committee on Public Undertakings, 1967-8, p. 11.

units [would] be conducive to [future] expansion.”⁵³ Since neither of these two goals has materialized in the intervening 27 years, it seems reasonable to assume that the real motive for the separation was, as the Secretary of Defence Production admitted to the Parliamentary Committee, “for reasons of . . . [the] economic development of new areas.”

In contrast, the creation of a high technology security complex in the south seems driven by a propitious combination of strategic and efficiency factors. The locations are climatically suitable, Bangalore is relatively cooler and more temperate due to its altitude and Hyderabad’s dry climate is suitable for some industrial-metallurgical operations. There is a large pool of trained and skilled engineers and scientists in all the cities and surplus land available for state acquisition. This region is beyond the reach of all land-based Chinese and Pakistani aircraft (without mid-air refuelling capability) though not from the Intermediate Range Ballistic Missile (IRBM) capabilities of the People’s Republic. Finally, as the defense posture of the country expands to include more far flung concerns, such as the littoral states along the Indian Ocean, this region is geographically well placed to support and aid that effort.

To demonstrate further how long term considerations of state rather than immediate political considerations drove the effort, it should be remembered that most of the southern part of the country was ruled by non-Congress-I governments for the period 1970-1990. Under the ruling Congress-I government, the practise of directing central government funds away from states that were not allied with it was well established, as is most clear in the case of West Bengal. However, in the case of the defense complex short-term party politics took a back seat to national security.

State Functioning and Decision-making

Decision making in the Defence Ministry rests with a number of committees, presided over by the Defence Minister’s Committee.⁵⁴ Dealing directly with defense production is the Defence Minister’s (Production and Supply) Committee.⁵⁵ At present, at the functional level, two departments within the Ministry of Defence are responsible for the “satisfaction of the [needs of the armed] services to the maximum extent.”⁵⁶ These are the departments of Defence Production and Supplies (formed by the merger of the departments of Defence Production and Defence Supplies in 1985) and the department of Defence Research and Development.

The former department combines two broad functions. First, it maintains oversight of the ordnance factories and the defense public sector units. Second, it seeks effective coordination with the civilian sector for the production of additional defense-related equipment. These functions are carried out through six directorates:

a. Supplies Wing. It is responsible for import substitution via civilian sector supplies, the production of goods in the civil sector developed from defense R&D, and the purchase of defense goods directly from the civilian sector.

b. Directorate of Planning and Coordination. This directorate was set up in 1964 for the preparation of an overall defense production plan. Its functions now include the processing of new projects in the ordnance factories, monitoring indigenous programs relating to electronics and aircraft, and coordinating with the Supplies Wing for “increased indigenization.”

c. Directorate General of Inspection. Apart from quality assurance and the inspection and approval of stores like the Supplies Wing, this directorate also oversees the production of defense R&D developed goods in the civil sector.

⁵³. *Eighth Report*, Committee on Public Undertakings, 1967-8, p. 10.

⁵⁴. This committee is composed of the Minister of Defence, Minister of State for Defence, the three Service chiefs, Defence Secretary, Secretary, Dept. of Defence Production, Scientific Adviser to the Ministry of Defence, Secretary, Defence Research and the Financial Adviser, (Defence). This committee has two sub-committees, the Principal Personnel Officers Committee and Principal Supply Officers Committee.

⁵⁵. Apart from the members listed above, this committee additionally contains the Secretaries, Ministry of Defence and Dept. of Defence Supplies, Director General of Inspection and Director General of Ordnance Factories.

⁵⁶. *Annual Report 1986-87* Ministry of Defence, Government of India, p. 60.

d. Directorate of Standardization. To further as much as possible the degree of overlap in the supplies and goods used by the armed forces, this directorate codifies defense stores and produces joint service standards and specifications.

e. Directorate of Defence Exhibitions.

f. Directorate of Technological Development and Production (Air). This directorate conducts quality assurance and inspection of indigenously produced and imported aeronautics-related equipment. It aids the development and establishment of import-substitution efforts in aeronautics components and is associated with larger indigenous projects at all stages of their development. Finally, it participates in investigations into aircraft accidents and crashes.

The department of Defence Research and Development “serves as the focal point for all scientific and technological aspects of national security . . . [Its] mandate is accomplished through a network of 45 laboratories/establishments administered by DRDO.⁵⁷ These labs conduct research and development in a variety of areas, concentrated in aeronautics, special materials, armaments and combat vehicles, electronics, naval R&D, specialized medicine, food and clothing and missiles/rocketry. The DRDO is under the final supervision of the Scientific Advisor to the Minister of Defence.

The ordnance factories themselves are controlled by the Ordnance Factory Board, headed by the Director General of Ordnance Factories. Nine other members assist the Director General in the management of “staff and line” functions and the ordnance equipment and armored vehicle groups of factories. Defence public sector units are independently managed by state employees, though overall administrative control falls under this department. By virtue of being state owned corporations, oversight is also maintained by the Parliamentary Committee on Public Undertakings and the Bureau of Public Enterprises. This Bureau, which was originally under the Ministry of Finance, has since been shifted to the Ministry of Industries.

A glance at the functions of the defense production directorates outlined above suffices to show a high degree of administrative overlap. Both the Supplies Wing and the Directorate of Inspection encourage the import-substitution of items by production units in the civil sector. The Planning Directorate and the specialized Directorate of Technological Development and Production (Air) are both responsible for the indigenous production relating to aeronautics projects. Both the Supplies Wing and the Planning Directorate undertake the conversion of defense R&D projects into production processes that can be farmed off to the private sector.

To understand the overall functioning of the defense production bureaucracy, however, another aspect has to be factored in. This is the importance of financial considerations in all state bureaucracies. The pre-eminent position of the Ministry of Finance in the executive branch of government originates, on the one hand, with the position given to this ministry in the colonial period and reaffirmed, on the other hand, by the pressures of independent statehood and the near-religious fanaticism of the “need to conserve scarce resources.” While the need to be frugal was, *prima facie*, beyond criticism, the role assumed by this ministry was that of final arbiter in the decision making surrounding practically every large project in every ministry. The criteria applied by Finance tended to be of strict temperance. The cheapest, rather than the more efficient, project was more likely to be approved; short term cost considerations were dominant. Non-economic considerations were given short shrift, often leading to a situation where long term costs rose due to inappropriate criteria being applied at the initial stages of the project.

The Ministry of Defence, though relatively autonomous from civilian pressure due to its function, was no exception. The Finance Ministry seconded officers (“internal financial advisors”) to Defence, the departments of Defence Production and Supplies, the DPSUs and the Ordnance Factory Board. These individuals sat in on every important decision to represent the national exchequer. The senior financial advisor in the Ministry of Defence was responsible for the final formulation of the defense budget and presented it to the Finance Ministry for their final approval.

⁵⁷. *Annual Report 1986-87 Ministry of Defence, Government of India*, p. 61.

This earlier system appeared to have an advantage from the point of view of inter-administrative bargaining, for the budgets which emerged from each service headquarters had already been screened by lower-level financial advisors. Informal consultations with the Ministry of Finance had probably already happened and there would be conditional agreements about the size of the budget long before it was formally presented, making swift acceptance built-in. What this system did in effect, however, was ensure that final budgetary allocations were made in the Finance Ministry rather than in the other organs of state since their own seconded staff were engaged in the formal process of creating the budget.

As a result of criticism of the centralization of decision making in the financial allocation process, the system began to change in “installments” from the 1960s. The financial responsibilities of the Defence Ministry became fully internalized with the introduction of the integrated financial advice system from August 1983, but at the apparent cost of greater administrative bargaining and overt conflict.⁵⁸

At present, the Defence Secretary and Minister scrutinize the aggregate services and departmental budgets and are the final authority on changes to be made within the Defence Ministry. They then present a consolidated budget to the Defence Finance Secretary and must make a convincing case for their financial demands. The Ministry of Finance budget section then gives the final approval of the budget, though usually contingent on at least a few changes or cuts. Since a large proportion of the budget is allocated towards continuing projects, “cuts are usually made in new proposals, in the face of ongoing projects, expansion and new benefits [for personnel].”⁵⁹

Though the degree of Finance Ministry control has formally lessened, their influence stays strong through a variety of informal connections and institutions. The continuity of the bureaucratic institution compared to the much shorter tenures of the armed forces chief of staff sometimes results in a situation where the latter are forced to consult Finance Ministry files to become acquainted with past policies and procedures. In the case of budgetary requests involving the release of foreign exchange, the Economic Affairs Committee of the Foreign Ministry is always consulted at an early stage in the budgetary process, even when the foreign exchange is part of an existing program that has been approved *in toto* at its inception. Most decisions to procure arms from abroad involve the finance ministry from the beginning or at the very latest from the point where the staff qualitative requirements (SQR) is presented to a negotiating committee “in which all interests are represented.”⁶⁰

The dominance of the finance ministry, which ultimately has its roots in the scarcity of and increasing demands on resources, has affected the security establishment in another way. From 1964-65 the Defence Ministry has prepared a five year defense plan which, ideally, coincides with the five year development plans of the civilian state sector. From 1970, the plan was redefined as a “roll-on” plan, which meant that the plan “was to be updated every year by the addition of another year.” This exercise in innovative planning was upset the very next year with the outbreak of war between India and Pakistan. The defense plans were substantially modified in 1975, 1981-82, and presently stress modernization and induction of the latest technology weapon systems.

The plan is constructed through a process of consultation and interaction between all elements of the defense ministry, the financial advisors, service headquarters, defense production, and DRDO. But while the Ministry of Defence *Annual Report* states, “[the planning process] provides a forum for effecting coordination between the services and the research and production agencies,” it also mentions the “*allocation of funds under the plan is made from year to year through budgetary provision.*” (emphasis added) This arrangement causes an annual reconsideration of the plan to assess “past performance, rearrange . . . future priorities and is a powerful

⁵⁸. The functions of the Finance division are as follows: (a) to examine all defense matters having a financial bearing, (b) to render financial advice to committees, service headquarters and their branches, (c) to act as Associate Finance . . . thereby providing a link to the Ministry of Finance, (d) to assist in the formulation and implementation of all scenes involving expenditure, (e) to assist in the formulation and implementation of defense plans, (f) to prepare the defense budgets and other estimates and to monitor progress, (g) to exercise post-budget vigilance, and to function as chief accounting authority to the ministry, (h) to prepare the appropriation accounts, and (i) to discharge the responsibility for payment and internal audit of defense expenditure. Adapted from *Annual Report 1984-85* Annexure II, Ministry of Defence, Government of India.

⁵⁹. Interview with retired Finance Ministry official, New Delhi, November 11, 1989.

⁶⁰. Interview with retired Finance Ministry official, New Delhi, November 11, 1989.

instrument of enforcing financial discipline.”⁶¹ Ostensibly, the plan is based on strategic needs and long term security considerations and were this so, this method of annual evaluation would be sensible, or at least cause no long term harm. But as another *Annual Report* candidly states,

at the operational level, planning remains a two-tier exercise in choices: determination of *volume of resources* that the nation can devote to its defense and the allocation of these resources among the various competing interests claiming share (sic) (emphasis added)⁶²

As many staff officers have pointed out, you cannot plan for ten or twenty years in the future and have the funds for these projects subject to yearly vicissitudes.

The planning exercise has other problems as well. Why it cannot fully relate the security environment to national security objectives and interests and finally to potential responses (as might be theoretically expected), is suggested by the well-known Indian defense analyst, K. Subrahmanyam:

The service chiefs, with their tenure of three years—often less than that—are so preoccupied with administrative chores and planning for immediate operational contingencies that they have no time to devote to long term planning . . . The defence planning staff created in 1986 had about a dozen officers. There is, besides, such a rapid turnover, they are unable to serve as an effective planning mechanism.⁶³

What becomes of concern for the chiefs, hence, is how the security pie is being divided up among competing factions. In a context of scarce resources, and in the absence of a permanent planning staff with political influence, the process described above in fact forces the subordination of long term security needs and strategic planning to the vagaries of short term financial expediency. In spite of the plan being formally presented as a five year roll-on plan with additional years being tacked on to the end, rising expenses and the annual budgetary approval process in Parliament deny the horizon that is its value.

In passing it may be said that maintenance and continuing expenses are always the first to suffer, since these expenditures either have no active constituency (maintenance) or are predominantly related to weak services (the Navy). In the words of a former Finance ministry official:

The planning process is really an arithmetical aggregation of what the services think they require for the next five years . . . the long term planning perspective that all Services talk about is not really valid since the budget process does not allow this.⁶⁴

Disregarding the security implications of the discussion above, the ‘rational’, bureaucratic goal of long term planning is clearly undermined by procedures that deny its fulfillment.

Extent of Private Sector Participation in Defense

The department of Supplies has an important institutional role to play in encouraging private sector participation, for it is mandated both to find civil suppliers of defense goods and to offload DRDO-indigenized products on civilian producers. This department tends to concentrate on smaller scale operators, because according to them, from the point of view of representatives of larger scale units in the private sector, defense work is unrewarding for the lack of “uniformity in the order pattern and . . . the [small] volume of orders.”⁶⁵ However, an idea of the scale of indigenization and offloading can be derived from the following table.

⁶¹. *Annual Report 1983-84* Ministry of Defence, Government of India, p. 7.

⁶². *Annual Report 1984-85* Ministry of Defence, Government of India, p. 5.

⁶³. K. Subrahmanyam. “The Next Defense Plan: Need for a Long Term Perspective,” *Times of India* (Bombay), 11 August 1989, p. 12.

⁶⁴. Interview with retired Finance Ministry official, New Delhi, November 11, 1989.

⁶⁵. *Annual Report 1983-84* Ministry of Defence, Government of India, p. 85.

Table 6: Purchases from the Civilian Sector by Selected State Units (Figures in millions of 1985 rupees)

Dept. of Supply	1985-86	2,126.23
	1984-85	1,498.20
	1983-84	1,528.49
	1982-83	907.26
	1981-82	1,049.69
HAL	1985-86	169.03
	1984-85	87.30
BEL	1983-84	38.06
	1982-83	58.92
BEML	1983-84	48.16
	1983-84	75.27
	1982-83	121.77
GRSE	1981-82	106.49
	1985-86	17.99
GSL	1982-83	15.44
	1984-85	4.29
BDL	1982-83	2.23
	1985-86	113.64
	1983-84	4.21

Source: *Annual Reports*, Ministry of Defence, Govt. of India, various issues.

Sub-contracting of inputs to private entrepreneurs by defense public sector units has now become a matter of explicit policy. Both Bharat Electronics and Hindustan Aeronautics have created physical enclaves where private individuals are helped to create ancillary units. Apart from the physical facilities; financial assistance, aid in perfecting manufacturing techniques and managerial guidance were provided at subsidized rates, or free of cost, to help create self-supporting and efficient ancillaries. Additionally, wherever possible, purchases are made from the small-scale sector.⁶⁶

Technological factors, however, constrain the participation of private capital as sub-contractors. HAL had the greatest difficulty in finding appropriate suppliers because of the nature and quality of the work needed. Also, the terms under which sub-contracting was done were not always agreeable to potential suppliers. "All orders are placed for five years . . . of which the first three years are firm and the last two are shaky. [As long as] the level of technology involved in manufacture was low, the ancillary units in the HAL complex seemed to manage, now it's not easy [for them]."⁶⁷ Implicit in these comments was also the suggestion that HAL would have preferred to have done without the small scale operators but the latter were foisted on them for political reasons.

BEL has had more success in this effort. Not only do they consciously attempt offload working technologies as soon as possible, but since a great deal of electronics manufacturing involves small components, piece-work that allows the viable functioning of small scale units is possible. The company has set up a subcontractors' quality assessment center to ensure both quality of inputs and to act as an extension facility. One manager suggested that this experience (of "technological spread," as he called it) was doubly beneficial because it aided their export effort as well. Other developing countries had often stated policies of decentralized production: the ability to construct projects where the dispersal of production loci was possible without loss of efficiency, gave BEL an advantage in those markets.⁶⁸

Most of the defense labs and public sector units using higher technology dependent processes have contractual relationships with private sector firms, though precise figures are not available. One source of access for private firms to the defense labs is through their access to foreign technology via collaboration agreements with multinationals or their subsidiaries. Products of this kind include instrumentation and testing devices, computer related peripherals and hardware including printed circuit boards, optical products and lenses and common supplies for labs engaged in health and food research.

⁶⁶. At present, small scale industries are defined as those that have a total capital investment of less than Rs. 70 Lakhs (1990).

⁶⁷. Interview with retired HAL official, Bangalore, October 15, 1989.

⁶⁸. Interview with BEL manager, Bangalore, October 16, 1989.

Hence, we see a pattern of state interaction with the private sector that initially might appear to have rescinded the views expressed above, but actually seems to use the policy of private participation to discriminate in favour of the small scale sector rather than allow larger and possibly more efficient capital to enter the industry.

Problematizing the State, the Private Sector and Defense

The discussion of the relation between the state and the private sector in the defense arena has taken place implicitly. The larger debate on this issue has been primarily concerned with the relative autonomy of the Indian state in development. Two related theoretical concerns are central to this debate: the explication of the class nature of the state and the relative strengths of the different partners in the dominant coalition: agrarian elites (“rich farmers”), industrial elites (“industrial bourgeoisie”) and the state (“professionals” in the public sector).⁶⁹

State autonomy in India is generally accepted to be declining since the mid-1960s. “As a consequence [of the rise of proprietary classes], the autonomy of the Indian state is reflected more often in its regulatory (and hence patronage-dispensing) than developmental role.”⁷⁰ Following this, most scholars have problematized the fundamental issue in Indian political economy as a struggle for dominance between the capitalist agricultural sector and the industrial bourgeoisie with the state apparatus taking on a subordinate position, in effect being re-defined as part of the victor’s spoils.

Analytically, two means of assessing the relative strength of these “fractions” of the dominant coalition can be distinguished. Simply put, the first functionalist approach examines the policies of the state with respect to each fraction, and thereby determines in whose short and long term interests the state operates. Again simplifying, the second, more reductionist, option understands the behavior of the state by assessing the class nature of the state. Immediately it is clear that when put in terms of a conflict between two fractions of the dominant coalition, the state is not simply a bystander to be appropriated and reconstituted by the eventual winner. The state itself has the means to affect the outcome; and the power of the state, though reduced relative to other sectors, is still a substantial component in the overall calculus of power in the country.

The first approach is largely preferred by analysts: there is more evidence using this method, data can be collected in numerical form and the validity of conclusions would appear to be more easily supported. The evidence is, however, ambiguous. Agricultural elites continue to perpetuate their insulation from state encroachment and ensure ever-increasing subsidies for agriculture: especially water, fertilizers and procurement prices. Industrial elites have benefitted from protected markets, acquired monopoly profits, and in the wake of liberalization, have allowed for a new phase of technology imports without losing ground to foreign capital.⁷¹ Yet, contrary to these evaluations, it may be said that liberalization shows the power of agricultural elites to break the protected monopolies of domestic capital by forcing greater competition. Also, national statistics show the share of agricultural product declining and the much vaunted power of the agricultural sector to insulate themselves can be characterized as no more than a “holding game,” suggesting the inability of this sector to increase their relative share of the national distributive product.

With respect to the second option, the class nature of the state, empirical evidence cannot be marshalled easily. This flows on the one hand from inadequate theorizing about the nature of the “middle” classes in India which makes it difficult to know what to look for, and on the other, the collection of this data, which would probably be attitudinal studies and background surveys, is next to impossible for reasons of size, expense and access. Reducing the class orientation of the state to the composition of state managers is based on their access

⁶⁹. This phrase owes its origins to the important work on the Indian state by Pranab Bardhan. See *The Political Economy of Development in India* (Delhi: Oxford University Press, 1984).

⁷⁰. Bardhan, *Political Economy of Development* p. 39.

⁷¹. Crudely put, the pro-agricultural view is expressed in Paul Brass, *The Politics of India since Independence* (Cambridge: Cambridge University Press, 1990); Bardhan represents the pro-industry view.

to “cultural capital:” a sophisticated theoretical construct which is difficult to define precisely or to limit in scope.⁷²

Vanaik points out these problems of defining precisely the state or its managers, and its autonomy, and then pauses. Suggesting that this is, after all, a transitory phase, he falls back on functionalism: “. . . if the ‘bureaucratic class’ exists, why has it not done better for itself in the eighties?”⁷³ He then proceeds, correctly, to disaggregate the bureaucratic class into political elites and bureaucratic elites, at the center and state levels, and endows them with different powers based on the political space they occupy. This sets up his resolution to the conflict scenario set out above:

But the dominant coalition need not be a permanent fixture. For all the sharpness of the present conflict between agrarian and industrial bourgeoisies, it remains a struggle about the terms of accommodation between the ‘first’ prospering India, as distinct from a ‘second,’ where tragic levels of backwardness and poverty persist. The dominant coalition could give way in time to a more conventional ruling-class alliance or even a bloc . . . [if] the capitalist farmer *family* [is] able to make the transition to becoming the farmer capitalist *family*.⁷⁴

But the question of the state and its autonomy is still unresolved.⁷⁵ Even if the function of the state in contemporary India is to act as manager of domestic conflict, in the sectors of defense and national security it is much more. As Vanaik himself points out:

. . . the continued allocation of significant resources to defence is not a function of the pressure of the ‘public bureaucracy’ as a whole . . . but the general vision of the future held by the state elite (which includes top echelons of defence services) and its larger political and military ambitions. Revealingly, defence expenditure remains something of a sacred cow, subject to only the faintest and most occasional criticisms.⁷⁶

The “common-sense” of the state’s domination of national security, i.e., what I called at the outset of this paper the “production of national security,” or the uncritical unanimity of the “general vision of the future,” referred to above, is not obvious at all. If the state has lost its autonomy in most respects in the domestic arena how has it managed to retain it, and perhaps even enhance it, in the external realm of national security?

My response is to understand the problem of state autonomy in terms of a combination of institutional mechanisms to retain autonomy and the larger question of state legitimacy. One aspect of the analysis of the developing or post-colonial state ignored by the scholars referred to above is the question of legitimacy. The post-colonial state differs fundamentally from the advanced capitalist state with respect to this factor. Unlike the legitimacy of the advanced capitalist states which is founded on a combination of internalized liberal values, democratic institutions of government and the historical fact of limited political enfranchisement *following* state formation, the post-colonial state is “overdeveloped” with respect to its coercive apparatus in a context of economic backwardness.⁷⁷ Hence, legitimacy comes from the simultaneous reversal of backwardness, or the process of development, and from the normalization of its coercive role, supplanting the dominance of the colonial state with the legitimate authority of the liberal state.⁷⁸

⁷². The concept was developed by Pierre Bourdieu. See his *Outline of a Theory of Practice* (Cambridge: Cambridge University Press, 1977). Achin Vanaik discusses the inadequacies of the use of the concept in the Indian context in *Painful Transition* p. 20 ff.

⁷³. Vanaik, *Painful Transition* p.25.

⁷⁴. Vanaik, *Painful Transition* p. 25-6. Original emphasis.

⁷⁵. A further shortcoming of this analysis is its difficulty in clearly separating early state autonomy at the time of dominance of a single political party, the Congress, with state autonomy per se. The relation of political regime to the State is rarely made explicit and its implications for the present, more plural, situation are not clear.

⁷⁶. Vanaik, *Painful Transitions* p. 24.

⁷⁷. For the European state see Charles Tilly, ed., *The Formation of States in Western Europe* (Princeton: Princeton University Press, 1975). For the notion of “over-developedness” see Hamza Alavi, “The State in Post-Colonial Societies: Pakistan and Bangladesh” *New Left Review* 74 (1972)

⁷⁸. Ultimately, legitimacy is normalcy. Normalizing the actions of the state, in politics and in economics, are acts of ideological production in which the state has successfully defined the limits of its other, non-state actors while leaving its own boundaries unmarked. In the developing world, national security is normalized by the existence of a world system in which the boundaries of

The construction of legitimate authority and the process of economic development feed into each other. The legitimacy of the state's monopoly in violence can only be supported if the state is seen to protect the interests of all its citizens equally, whether from foreign attack or by appearing to stand as neutral arbiter in conflict between social groups. Yet the process of economic development, especially for the latecomer, does not permit the bystander state. The state becomes the prime motor of growth by its ability to mobilize capital, influence over production and allocation decisions, and its guarantee for legal forms of property. In most arenas, these two positions of the state in relation to society, the interventionary and neutral, are clearly in tension —except in the realm of national security.

Definitions of national security vary over time and space but national security is always a public good. Thus, the state, acting in the name of national security, is acting for all citizens. By controlling how national security will be defined, the state also retains control over definition of the appropriate means to enhance national security: its interventionary role comes naturally and again, is justified by the public good nature of security. But this latter aspect, the definition of the means to enhance security, leaves state managers open to the question of how well they perform those tasks. Here the institutional aspect of the insulation of national security concerns comes in. The only possible alternative to state production of the means to security is the private industrial sector. The question then becomes, how does the national sector component of the state continue to insulate itself from the ravages of the private sector? The evidence appears contradictory.

While the security complex in India has always been grossly biased toward the public sector, there has always been a component of private sector participation in production. On the one hand, the Industrial Policy Resolutions of 1948 and 1956, the primary documents of state industrial policy, have always reserved the “commanding heights” of the economy, which includes defense, as the sole purview of the state. On the other hand, from the very origins of the complex, there have been and continue to be attempts made, especially when the budget is being discussed or the performance of the defense sector being questioned, to assert that efforts had been made to seek out civilian contractors for defense supplies.

During the time when the threat from external aggression seemed very small, it was tactically useful for those in favor of larger defense expenditures to allow closer ties between the private sector and the defense production enclave. It made allies within the private sector and could be used to point to the obvious “developmental” gains from defense spending in the form of higher civilian capacity utilization and output. For example, “defense industrialization . . . has had its impact on the general industrialization programme” and “wherever possible, therefore, the defence production equipment should be used for items required in the civilian industry—[since] this . . . helps civilian economic growth.”⁷⁹ Justifying the output of defense industries in terms of civilian benefits ended with the military debacle of 1962.

Hence, during this period the relation between “defense and development” was constructed in terms of a simple trade-off or a zero-sum game. Although national security was defined as a totality incorporating both development and defense, the perception was very strong that in fact these two goals were mutually exclusive. This perception takes its clearest institutional form in the definition of defense outlays as non-Plan expenditures. This definition belied the conceptual totality indicated above and made it clear that defense was outside the course of civilian development overseen by the Planning Commission.

Once the need for military security entered the political discourse as a factor that needed no justification, the relation between the defense and the civilian production sector changed substantially. The state defense managers now could articulate quite explicitly their dislike and rejection of the private sector. Their discursive strategy employed two primary ideological referents and has been described as “[a] lingering Brahminical cultural environment that is highly suspicious of private capital accumulation and often identifies money making in trade and industry with greed and dishonesty, reinforced with modern socialist rhetoric.”⁸⁰

all states have already been defined beyond question. The developing state is legitimized in the eyes of the external world by being accepted as the sole possessor of a certain territory.

⁷⁹ H. C. Sarin, *Defence and Development* USI National Security Lectures, (Delhi: United Service Institution of India, 1979), pp.50, 47.

⁸⁰ Bardhan, *Political Economy* p. 58.

Negative images of the private sector operated at many levels within society. These images found expression in the resentment toward petty shopkeepers who were seen as “hoarders” in times of shortage, thereby making profits from the misery of others. Others also questioned the nationalist credentials of the large private business houses, who were seen to have become patriots only when it was clear which way the wind was blowing and even then hedged their bets by supporting both sides. Both led to the same result, i.e., an attitude toward private capital never completely free of suspicion and resentment.

These images are explicit in the views and writings of state managers, often masked by reasons of practicality. For example, testimony by representatives of the Defence Ministry in Parliamentary hearings asserted that private sector production was “slower” or capacity “too small,” or, that there was an unspecified difficulty for “various reasons” which meant that the private sector could not supply more than a certain amount of defense supplies, especially because of the “lack of technical guidance, research and scientific assistance.”⁸¹ More direct statements on this attitude come from a former Defence Secretary, P.V.R. Rao. Rao had no hesitation saying that the quality of goods made by the private sector could not be trusted and raises the bogey of the imperative of national security: “A civil consumer has no option but to make do, for example, with a knife that does not cut or has a short life; a soldier at the front has no option.”⁸² He went on to say the private sector was inherently more expensive because they were not willing to share resources with other private firms in order to achieve effective scales of operation. They had their eye on immediate profits aided by “the absence of quality control and the prevalence of a seller’s market . . . [Additionally] a few unscrupulous men . . . thought the invitation to assist [the war effort] was a good opportunity to secure import licenses and foreign exchange, which would have been otherwise unavailable.”⁸³

Or, in the even more ideologically explicit statement below, the dangers of a military-industrial complex are raised, the peace-loving nature of India is affirmed, but finally, some room is given to the limits of private sector participation—under the strict control of the defense enclave.

The private sector would not normally be interested in building up such industrial potential for which there is no ready or steady market. [Hence they would have to export] . . . The undesirable pressures generated by the private armament industry in Europe and America are well known. It would be inconsistent with the principles for which India stands to give a foothold to such an armament industry within the country . . . [Government of India policy] permits the private sector to play its part in the manufacture of ancillary equipment or components and assemblies which will facilitate the manufacture of the end product by the public sector units.⁸⁴

The power of this rhetoric ultimately allowed the defense production sector to override the views of both special defense committees and Parliamentary oversight committees:

Ordnance factories should concentrate on producing vital and critical items for which the capacity is either not available or cannot be established in the civil sector for various reasons, leaving it to the trade to supply common user items for civil and defense purposes.⁸⁵

Both the Baldev Singh Committee and study groups of the Planning Commission (1965) formulated plans that would have led to the direct involvement of the private sector in defense production. They probably meant no more than the supply of dual-use items like clothing, non-armored vehicles and components by the private sector where capability already existed. The industrialist J. R. D. Tata, in the early 1950s, had suggested the

⁸¹. *Appropriation Accounts and Audit Reports (Defence Services)* Public Affairs Committee, 69th Report, 4th Lok Sabha, (1968-69), pp. 11-12.

⁸². P. V. R. Rao, *Defence Without Drift* (Bombay: Popular Prakashan, 1970), p. 234.

⁸³. Rao, *Defence Without Drift* p. 235. The resentment of the private sector is common among the personnel of the armed forces as well. In an interview with an Air Force supplies officer, for example, the individual recounted with pleasure the satisfaction he took in making “*baniyas* (traders) in their expensive cars” sit in his anteroom for hours before letting them meet him. Delhi, October 7, 1989.

⁸⁴. P. V. R. Rao, *Defence Without Drift*.

⁸⁵. Public Affairs Committee, *Appropriation* p. 14.

possibility of the production of jeeps, trucks and even tanks in the private sector under a consortium of private entrepreneurs.⁸⁶ None of these plans ever got off the ground.

The ability of the defense bureaucrats to insulate themselves by excluding the private sector was aided by the consonance of their message with the larger political culture. Socialist goals were embedded in the anti-colonial independence struggle and enshrined in the Directive Principles of the Constitution. The massive expenditures incurred to build up a state sector in the 1950s and 1960s, the undemocratic top-down process of state planning, the extremely restrictive laws and regulation on both the domestic and foreign private sector, the nationalization of the largest private banks, the institution of expert committees like the Dutt Committee to look into anti-trust violations, were accepted by most people without question due to the legitimacy of Nehruvian socialism and its implicit image of the private sector.

From this point, and aided by the intensifying technological requirements of a modern arms industry, it was possible for the state defense production sector to create an enclave insulated from both the private industrial sector and other sectors of the state apparatus. As legitimacy began to decline in developmental areas of state intervention, the state began to rely more and more on national security and mega-technology projects in order to stem the flow. *Ceteris paribus* this process of the changing relation between the state and civil society would have ensured this sector greater autonomy and lack of oversight. However, the international context has changed and the nature of conflict in South Asia appears now to be primarily driven by sub-national bodies. The implications of these exogenous changes are the subject for another paper.

⁸⁶. Interview with retired defense production official, Delhi, October 9, 1989.

Appendix A

1. Ministry of Defence:

- a. Defence Public Sector Units (DPSUs)
- b. Ordnance Factories (OFs)
- c. The Defence Research and Development Organization (DRDO)

2. Department of Space/Indian Space Research Organization (ISRO):

- a. Vikram Sarabhai Space Center (VSSC)
- b. Physical Research Laboratory (PRL)
- c. Sriharikota Range (SHAR)
- d. Liquid Propulsion Systems Center (LPSC)
- e. ISRO Telemetry, Tracking and Command Network (ISTRAC)
- f. National Remote Sensing Agency (NSRA)

3. Department of Atomic Energy:

- a. Bhabha Atomic Research Center (BARC)
- b. Tata Institute of Fundamental Research (TIFR)
- c. Electronics Corporation of India Limited (ECIL)
- d. Reactor Research Center, Kalpakkam
- e. Indian Rare Earths Limited
- f. Uranium Corporation of India Limited
- g. Nuclear Fuels Complex

4. Department of Electronics:

- a. Semi-Conductor Complex Limited (SCL)
- b. Center for Advanced Studies in Electronics (CASE)
- c. Society for Applied Microwave Electronics Engineering and Research (SAMEER)

Appendix B

Total Capital Outlay: Production Units and Armed Services (Rs. Lakhs and Millions of US dollars in 1960 prices: Selected Years)

<i>Year</i>	<i>Rs. Lakhs</i>	<i>Million Dollars</i>
1962-3	16,334.16	343.01
1963-4	29,127.08	613.13
1964-5	33,012.66	693.25
1965-6	39,869.34	626.97
1966-7	44,683.54	595.78
1967-8	65,683.48	875.78
1968-9	76,261.47	1,016.82
1980-1	739,121.78	8,535.88
1981-2	1,067,418.65	11,289.46
1982-3	1,291,355.73	12,786.97
1983-4	1,638,286.14	14,417.73
1984-5	1,974,153.87	15,960.50

Source: Defence Service Estimates, Ministry of Defence, Government of India and Bureau of Public Enterprises, various issues