India: A Defence and Security Primer

ALEXANDER ATARODI, EVA DALBERG, JERKER HELLSTRÖM,
LARS HÖSTBECK, JOHN RYDQVIST

FOI, Swedish Defence Research Agency, is a mainly assignment-funded agency under the Ministry of Defence. The core activities are research, method and technology development, as well as studies conducted in the interests of Swedish defence and the safety and security of society. The organisation employs approximately 1000 personnel of whom about 800 are scientists. This makes FOI Sweden's largest research institute. FOI gives its customers access to leading-edge expertise in a large number of fields such as security policy studies, defence and security related analyses, the assessment of various types of threat, systems for control and management of crises, protection against and management of hazardous substances, IT security and the potential offered by new sensors.

FOI
Swedish Defence Research Agency
Defence Analysis
SE-164 90 Stockholm

Phone: +46 8 555 030 00
Fax: +46 8 555 031 00

www.foi.se

FOI-R--2983--SE
ISSN 1650-1942

User Report
May 2010

Defence Analysis

Alexander Atarodi, Eva Dalberg, Jerker Hellström,
Lars Höstbeck, John Rydqvist

India: A Defence and Security Primer

Title	India: A Defence and Security Primer
Rapportnr/Report no	FOI-R--2983--SE
Rapporttyp Report Type	Användarrapport User Report
Månad/Month	Maj/May
Utgivningsår/Year	2010
Antal sidor/Pages	84 p
ISSN	ISSN 1650-1942
Kund/Customer	Försvarsdepartementet/Ministry of Defence
Projektnr/Project no	A911
Godkänd av/Approved by	Helena Bergman
Omslagsbild/ Cover Illustration	Scanpix

FOI, Totalförsvarets Forskningsinstitut
164 90 Stockholm

FOI, Swedish Defence Research Agency
SE-164 90 Stockholm

Sammanfattning

Att Indien har tagit steget in i 2000-talet med styrka får stora konsekvenser. Efter att länge ha ansetts vara ett land med begränsad global konkurrenskraft, delvis oförmöget att föda sitt eget folk, är Indien nu på god väg att bli en av världens största ekonomier, med en konkurrenskraftig serviceindustri. Trots denna positiva utveckling är Indien fortfarande delvis underutvecklat. Rapporten beskriver Indiens säkerhets- och försvarssektor med fokus på förnyelse och kontinuitet.

Indien har ett antal allvarliga inrikespolitiska säkerhetsproblem. Terrorismen och det etniska våldet understryker den minoritetsproblematik landet brottas med. Pakistan har sedan självständigheten från Indien varit ett dimensionerande militärt hot och fortsätter att vara det. Pakistan utgör dock inget militärt hot mot Indiens existens. Kina, däremot, är den regionala utmanare som på sikt utgör det allvarligaste hotet mot Indien.

Indien tillhör de tio länder i världen som har högst försvarsutgifter och är den tredje största importören av militär hårdvara. Importen står för omkring 70 procent av Indiens totala inköp av militär utrustning. Värdet på importen kan komma att öka till 80 miljarder dollar år 2022. Indien har som mål att utveckla den inhemska försvarsindustrin och ökar därför utgifterna för försvarsforskning och -utveckling (FoU). Från att ha varit en monopolistisk, statsägd försvarsindustri öppnades sektorn upp för privata aktörer 2001. Indiens senaste Försvarsupphandlingsförfarande (DPP 2009) uppmuntrar inhemska företag att lägga flera offerter samt att etablera samriskbolag med utländska företag. Därför blir den privata försvarsindustrin viktigare i framtiden.

Nyckelord: Indien, Pakistan, Kina, försvarsutgifter, försvarsindustri

Summary

India's rapid rise on the regional and global arena has far reaching implications. Long considered a country with limited global competitiveness in its economic structure and unable to feed its own people, India is now moving to become one of the world's largest economies, with a competitive service industry. While key parts of India are in rapid change, systemic legacy will persist and have influence over India in the foreseeable future. This report attempts to describe the Indian security and defence sector and how it is developing. India faces serious internal problems. The ethnic violence in some parts of the country needs to be addressed ant it is pointing to the challenge of minority politics that faces Indian society. Pakistan has ever since partition been a defining opponent and rival. Lately internal problems in Pakistan have changed and exacerbated the threat from terrorism and state failure. Yet the country does not pose an existential military threat to India. China, however, is New Delhi's future headache. China remains one of the main security challenges to India and is the most likely strategic threat to India's security in the future.

India is one of the world's top ten countries in terms of defence expenditure and is the third-largest importer of military hardware. The country's cumulative imports of military hardware may reach $80 billion by 2022. India aims at gaining knowledge and transfer technology in order to develop its indigenous defence technology industrial base. This is to be achieved through increases in spending on defence research and development (R&D). Currently about 70 per cent of defence equipment is imported. India's government opened up its monopolistic state-owned defence industry to private participation in 2001 and the role of the private sector should not be underestimated. India's latest Defence Procurement Procedure (DPP 2009) encourages leading domestic firms to bid for more production contracts and to establish joint ventures with foreign companies.

Keywords: India, Pakistan, China, Military expenditure, Defence industry

Table of Contents

List of figures

List of tables

Acronyms and abbreviations

APC	Armoured personnel carrier
BJP	Bharatiya Janata Party
BRIC	Brazil, Russia, India, China
CAPS	Centre for Air Power Studies
CCS	Cabinet Committee on Security
CDS	Chief of defence staff
CISC	Chief of Integrated Staff to Chairman, Chiefs of Staff Committee
COSC	Chiefs of Staff Committee
DDP	Department of Defence Production
DIPP	Department of Industrial Policy and Promotion
DPP	Defence Procurement Procedure
DPSU	Defence Public Sector Undertaking
DRDO	Defence Research and Development Organisation
FDI	Foreign direct investment
GDP	Gross domestic product
GoM	Group of Ministers
IAS	Indian Administrative Service
IDS	Integrated Defence Staff
IFS	Indian Foreign Service
INC	Indian National Congress
IT	Information technology
MIC	Military-industrial complex
MoD	Ministry of Defence
NASSCOM	National Association of Software and Services Companies
NCA	Nuclear Command Authority
NDA	National Democratic Alliance
NMF	National Maritime Foundation
NSC	National Security Council
OF	Ordnance factory
OFB	Ordnance Factory Board
PPP	Purchasing power parity
PSU	Public sector undertaking
UAV	Unmanned aerial vehicle
UPA	United Progressive Alliance

Executive Summary

India's security problems are both internal and external. Internally, India is suffering from terrorist activities in eastern and north-eastern parts of the country. In the eastern parts of the country, a Maoist militia is challenging the government in New Delhi. The militia is disseminating its ideas to people in the countryside where the Indian economic boom has not penetrated, leaving many people in continued poverty. The Indian Government considers the internal problem as one of the serious challenges to India's security. In addition, India still suffers from serious poverty, especially in the rural areas.

India's external security concerns are mainly related to China and Pakistan. India and Pakistan have gone through a series of conflicts since 1947, when the Indian subcontinent was partitioned and the two countries became independent of the United Kingdom. At the centre of the conflict is the issue of Kashmir. In the eyes of many people on both sides of the border, the Kashmir conflict is an unfinished war. However, despite Pakistan being a problematic issue for the Indian government, it is not able to pose a real military threat to India. Pakistan is economically weak, politically fragmented and military occupied to combat the internal conflicts with militant organizations along the Pakistani-Afghan border. The big threat from Pakistan would come if the country failed as a state.

China and India fought a war in 1962. China has taken control of a slice of Kashmir which India says was ceded illegally by Pakistan. China also disputes India's title to the state of Arunachal Pradesh. This means that the two countries still have some unresolved territorial disputes. There is a feeling in India that China wants to strangle the country with a "string of pearls". The imagined necklace consists of Pakistan, India's long-time rival; Nepal, where China backs the Maoist opposition; and Sri Lanka, where it is financing the country's big post-civil war reconstruction projects. Consequently China remains one of the main security challenges to India and strategically most likely a threat to India's security in the future.

That said, there are common interests too. Economic ties between the countries have grown rapidly in recent years and are expected to continue to grow. Chinese-Indian trade has soared and is likely to reach $60 billion during 2010. India does not have the economic scale to compete with China when it comes to manufacturing products. In that area, China is a world leader. However, India is a global provider of IT services. In this field, India has the competitive edge and a huge surplus in trade with the outside world. The two countries thus complement each other on the world market. Whether the economic incentives are increasing or reducing the security threat from China is debatable.

India is one of the world's top ten countries in terms of defence expenditure and is the third-largest importer of military hardware. Its cumulative imports of

military hardware are expected to double to more than $30 billion by 2012 and climb further to $80 billion by the end of its 13th Five-Year Defence Finance Plan 2022. India has the ambition, manifested through the spending on defence research and development (R&D) and such policies as “buy and make (Indian)”, to gain knowledge and transfer technology in order to develop an indigenous defence technology and industrial base.

The Defence Research and Development Organisation (DRDO) was established in 1958 and was charged with assisting India’s defence industry with R&D on military equipment. Today, the DRDO has roughly 50 laboratories and establishments financed by the government. The Indian defence R&D budget has accounted for 5–6 per cent of the total defence budget in recent years.

The DRDO’s R&D operations include various areas of military technology such as aeronautics, armaments, combat vehicles, electronics, instrumentation engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences. The DRDO has had a key role in the development of (for example) the Arjun main battle tank and the Tejas multi-role jet fighter.

The total strength of the DRDO is about 30,000, with 7,000 scientists, 13,000 technical personnel, and 10,000 administrative and support personnel. It is possible that the DRDO will be subject to a structural overhaul due to problems with on-time delivery and cost overruns in several projects.

About 70 per cent of defence equipment, mostly of high value and embodying high technology, is currently imported. Approximately 70 per cent of the imports are of Russian origin. Imports from Russia include naval guns, towed guns, surface-to-surface missile (SSM) launchers and multiple-rocket launchers. India’s military–industrial complex (MIC) is dominated by eight state-owned companies, known as defence public sector undertakings (DPSUs). The DPSUs were set up in order to build a strong and diversified production base capable of supplying technologically up-to-date weapons and equipment. They were established under the administrative control of the Department of Defence Production and Supplies.

In addition to the DPSUs, there are 40 state-run ordnance factories manufacturing equipment for the Armed Forces. The factories are under the jurisdiction of the Ordnance Factory Board (OFB). The gross production of the ordnance factories during financial year 2005/2006 accounted for approximately 40 per cent of domestic supplies to the Armed Forces.

India’s government opened up its monopolistic state-owned defence industry in 2001 to private participation through licensing from the Department of Industrial Policy and Promotion (DIPP). The role of the private sector in India’s defence industry should not be underestimated. The DPSUs outsource to the extent of more than 30 per cent, and about 80 per cent of production in the ordnance factories is outsourced. Private players have the potential to contribute much

more to meet the country's defence requirements and help achieve the stated goal of self-reliance. However, it can be argued that the capabilities of the private sector, in terms of financial, technological and managerial efficiency, have so far not been fully exploited. Private firms have, until recently, been debarred from direct production of defence items.

New Delhi has previously shortlisted a dozen private firms to be accorded special defence industry status, so-called Raksha Udyog Ratna (RUR), on the basis of turnover and past performance. RUR status would allow these companies to be treated on a par with public sector undertakings (PSUs). It would also allow them to access foreign technologies, enter into collaboration with overseas players for the manufacture of military hardware and avail themselves of up to 26 per cent foreign direct investment.

India's latest Defence Procurement Procedure (DPP 2009), published on 1 November 2009, encouraged leading domestic firms to bid for more production contracts and to establish joint ventures with foreign companies. The new DPP allows so-called requests for proposals (RfPs) to be issued to private Indian firms.

Previous versions of the DPP have included three categories of procurement, while a fourth category was added in 2009. The three procurement categories are (1) "buy", meaning direct imports; (2) "make", under which Indian R&D efforts translate into domestic manufacturing of hi-tech weapons systems; (3) "buy and make", under which some contracted products are imported and some of the products are manufactured within India. In the revised DPP of 2009, a new category – "buy and make (Indian)" – was introduced. This amendment will lead to RfPs also being issued to Indian companies that have the capabilities required; they will receive supply orders and be able to negotiate technology transfer terms with foreign firms. Foreign companies will be compelled to set up joint ventures with Indian firms, because they will only be able to sell their products through these jointly-owned companies.

Offsets are "compensations" demanded by the buyers from sellers in return for the outflow of resources to the latter. Offsets are the practice by which the award of contracts by foreign governments or companies is exchanged for commitments to provide industrial compensation. The DPP 2005 for the first time set out the official offset policy, stipulating that all contracts worth 3 billion rupees (Rs) or above would include defence-specific offsets amounting to 30 per cent. The Ministry of Defence expects the offset business to bring in about $10 billion in the 11th Five-year Plan (2007–2012) as 30–50 per cent of the value of defence deals is required to be reinvested in India's defence industry.

1 Introduction

1.1 Background and Aim

India is, for many reasons, one of the most interesting nations in the world of today. It has the second-largest population in the world and its gross domestic product (GDP) is growing at an impressive speed. When the rest of the world felt the decline in the world economy greatly in 2008–2009, India's economy continued to grow, especially in the service sector.

Sweden and India have enjoyed a long and fruitful relationship. The Swedish Government gives high priority to relations with India and contacts between the two countries have increased over the last few years in many areas. The same holds true for the political level as well as for, inter alia, business, research and development, and education.

This study was conducted over a few weeks in the autumn of 2009. It was started in September in anticipation of the signing of the military Memorandum of Understanding (MoU) between Sweden and India. The aim is to give Swedish participants in their future military contacts with India a primer on Indian defence and security. The study covers both background on India and more specifically the Indian defence structures. It gives an introduction to the security challenges that India faces today and in the near future.

The military MoU was signed in November on the sidelines of the European Union (EU)-India summit and thus this study will represent a timely input.

1.2 Method and Material

This study is a descriptive/qualitative analysis. It is based on both primary and secondary sources, including books, academic journals, magazines and newspapers. Three interviews are included in the study.

Interviews can be semi-structured or structured in character. As this was a qualitative study, structured questions were not suitable. Thus, the interview questions are semi-structured, which results in the interviews being to some extent steered by the respondent's answers.[1] In the interviews conducted for this study, the questions were not identical in each interview as the respondents had different backgrounds and knowledge bases. The selection of persons to be interviewed was based on different factors; they are experts on India, experts on

[1] I. M. Holme, B. K. Solvang, *Forskningsmetodik – om kvalitativa och kvantitativa metoder*, Lund, Studentlitteratur, 1997, pp. 75-86

India's defence structure or experts on India's economy and trade. The interviews were conducted either by telephone or face to face.

1.3 Outline of the Study

The study consists of three distinct parts and some final remarks. Chapter 2 describes India's political and economic background. It gives an idea of where India is today, and why. The chapter includes a short description of the key security challenges, both foreign and domestic.

Chapter 3 gives an outline of India's defence structure, including the support structure for the country's nuclear weapons. It also gives an overview of key modernization projects within the Armed Forces.

In Chapter 4 the Indian structure for defence research and development and defence policy analysis is described, together with India's defence industry. The public sector undertaking (PSUs), the Ordnance Factories and the increasing role of private industry are introduced and this chapter also contains a short discussion of the Offset Policy. Chapter 5 includes some final remarks.

2 India: A Politico - Economic Perspective

2.1 India's Political System

India became an independent nation in 1947. The country, which is located in South Asia, is the seventh-largest country in the world by geographical area and is the second-most populous. India is also the world's largest democracy. The country is formally a federal union made up of 28 states. Bounded by the Indian Ocean to the south, the Arabian Sea to the west, and the Bay of Bengal to the east, India has a coastline of 7,517 kilometres. It is bordered by Pakistan to the west, China, Nepal, and Bhutan to the north; and Bangladesh and Burma to the east. India is home to five major religions; Hinduism, Buddhism, Islam, Jainism and Sikhism.

During the years following its independence, India's foreign policy was influenced by the *Nehruvian* tradition. Jawaharlal Nehru[2] played an important roll in forming India's foreign policy during almost 20 years. Even after his death in 1964, his ideas were still influencing India's strategy in foreign policy. The reason for this is that much of the factors and elements crucial for India and its security remained intact. The struggle with Pakistan is a major pillar in India's foreign policy and it has not changed much since Nehru's time. Nehru's daughter, Indira Gandhi, who was prime minister during 1966-1977 and 1980-84, made some changes to India's foreign policy, but its main structure is still based on Nehruvian values. That said, the *Nehruvian* mainstream theory in foreign policy has been questioned from two perspectives; one is the conservative-realist perspective and the second is "Hindutva", which is more driven by Hindu ideology.[3] One of the weakest elements in India's foreign policy used to be the poor economic growth. Since 1991 however, the Indian economy has grown rapidly. A growing economy, together with an expected decline in the birth rate will lead to a more assertive foreign policy than before.[4]

India is a federal republic with a constitutional system that is similar to that of the United Kingdom (UK). The government power can be divided into three parts, the executive, the judiciary and the parliament. As with the constitutional system in the United States, India is made up of individual states. The central government has authority over these 28 states and even has the authority to

[2] First Prime Minister of independent India, held office from 1947 until his death in 1964.
[3] S.P. Cohen, *INDIA, Emerging Power*, Washington, D.C., Brookings Institutions Press, 2001, pp. 37-44, 89
[4] Ibid., pp. 102-104

change their boundaries. The president is the constitutional head of the executive branch, but real power vests in a Council of Ministers with the prime minister at its head. The Council of Ministers is collectively responsible to the House of the People. The prime minister of India is the head of government, while the president is the formal head of state. [5]

In the states, the governor represents the president. The governor is thus the head of the executive branch at state level, but real executive power rests with the chief minister, who heads the Council of Ministers. The Council of Ministers of a state is collectively responsible to the elected legislative assembly of the state. The president is elected by members of an Electoral College consisting of elected members of both houses of parliament and of the legislative assemblies of the individual states. Although the president does not have the real power according to the constitution, he/she is officially able to proclaim an emergency in the country if he/she is concerned about the security of the country or if any part of its territory is threatened either by internal conflicts and armed rebellion or by external aggression.[6]

The Council of Ministers comprises cabinet ministers, ministers of state and deputy ministers. The prime minister communicates all decisions of the Council of Ministers relating to administration of affairs of the Union and proposals for legislation to the president. Each department has an officer designated as secretary to the Government of India to advise ministers on policy matters and general administration. The parliament consists of the president and the two houses, the Rajya Sabha and the Lok Sabha. All legislation requires the consent of both houses of parliament. The Rajya Sabha consists of 245 members. Of these, 233 represent states and union territories and 12 are nominated by the president. Elections to the Rajya Sabha are indirect; members are elected by the elected members of legislative assemblies of the individual states. The Rajya Sabha is not subject to dissolution; one-third of its members retire every second year. The Lok Sabha is composed of representatives of the people chosen by direct election. It consists of 545 members with two members nominated by the president to represent the Anglo-Indian Community. Unless it is dissolved under unusual circumstances, the term of the Lok Sabha is five years.[7]

On the federal level India's politics have been dominated by the Indian National Congress (INC) for most of the years since independence. Politics in the individual states have been dominated by several national parties, including the INC, the Bharatiya Janata Party (BJP), the Communist Party of India and various regional parties. In the 1991 election, the INC formed a minority government and

[5] Embassy of India, Political Structure, Retrieved 10 Dec 2009 from http://www.indianembassy.org/dydemo/political.htm
[6] AsianInfo, *India's Politics*, Retrieved 29 November 2009 from http://www.asianinfo.org/asianinfo/india/politics.htm
[7] Ibid.

was able to complete its five-year term. The years 1996–8 were a period of turmoil in the federal government, with several short-lived alliances holding power. In 1998, the BJP formed the National Democratic Alliance (NDA) with several other parties, and this was the first non-Congress government to complete a full five-year term. In the 2004 elections, the INC won the largest number of Lok Sabha seats and formed a government with a coalition called the United Progressive Alliance (UPA), supported by various parties. In the 2009 Lok Sabha elections, more that 700 million voters were registered. The coalition won again with a surprising majority, with 262 seats, the INC itself winning more than 200 seats. The National Democratic Alliance, with the BJP as the leading party gained 158 seats. The election results mean that Manmohan Singh will lead India in the coming five years.[8]

2.2 India's Economy and its Competitive Advantages

India has the world's 12th-largest economy (at market exchange rates) and the fourth-largest in purchasing power parity (PPP) terms. Economic reforms since 1991 have transformed it into one of the world's fastest-growing economies. It does, however, suffer from high levels of poverty and illiteracy.

India's economic performance up to 1991 was poor. India has been criticized for having its economy tied up in socialist red tape for almost 40 years. Much of the criticism is fair, since India failed to achieve the high economic growth rates that other major Asian economies were experiencing.[9]

Since the mid-1990s, however, economic growth has picked up speed. The average growth rate has been around 6.5 per cent each year over the last ten years. If India maintains its current economic growth rate of about 7 per cent each year, its economy will double in size every 12 years. This means that India will overtake Japan as the world's third-largest economy at some point in the 2020s.[10] Currently the Indian economy is the fourth-largest in the world on a PPP basis.[11] It is one of the most attractive destinations for business and investment opportunities due to huge manpower base, diversified natural resources and strong macro-economic fundamentals. The growth and performance of the Indian economy in the world market is explained in terms of statistical information provided by the various economic parameters such as GDP

[8] BBC, *Congress hails India poll victory*, Retrieved 29 November2009 from http://news.bbc.co.uk/2/hi/south_asia/8051633.stm
[9] E. Luce, *In Spite of the Gods*, London, Abacus, 2007, pp. 19-27
[10] Ibid., pp. 261-265
[11] Economy Watch, *Top World Economies*, Retrieved 11 November 2009 from http://www.economywatch.com/economies-in-top/

and total trade in goods and services. Growth in the service sector is even stronger, with computer services showing the way.[12] During the last three years even Indian manufacturing has grown rapidly.[13]

The reason for India's impressive progress is the fact that the Indian economy has undergone enormous changes since the introduction of economic reforms in 1991. These reforms consisted of three main components – liberalization, privatization and globalization. They included various measures such as deregulating the markets and encouraging private participation. The aim was also to promote trade liberalization and remove the restrictions on domestic and foreign investment. India also reformed the financial sector and the tax system. All these radical changes modified the economic set-up of the country and integrated it with the rest of the world.[14] The service sector benefited the most when the changes were in place. Currently, India's service sector accounts for 55 per cent of the country's total output.[15] This also means that service industry in India has become a major force behind country's economic growth and trade. And this is where the country has gained competitive advantages on the global market.

2.2.1 India's Competitive Advantages

When India regained its independence in 1947, its political, social, and economic fate was in its own hands for the first time in almost 90 years. The country embarked on a journey to establish a democracy and representative government, define a plan for economic development, and build a society within which its large, diverse and fragmented population could prosper. More than 50 years later, however, opinions differed as to whether India had in fact realized the greater triumphs and achievements which Nehru anticipated. For many years the Indian economy was underperforming compared to other Asian economies such as those of China, South Korea and the "Asian tigers" (Singapore, Thailand, Hong Kong and Malaysia). With roughly 17 per cent of the world's population, India generated only 2 per cent of global GDP during the early 1990s. With 25 per cent of its 1 billion people living below the poverty line, India needed to sustain high annual GDP growth to keep up with population growth.

Today the country has become the world's 12th-largest economy (and the third-largest in Asia after Japan and China). India has made significant progress towards establishing a competitive position, especially in the service sector. Its

[12] J. Astill, "An elephant, not a tiger", *The Economist*, 13-19 December 2008, pp. 3-15
[13] Ibid.
[14] Government of India, *Indian Economy, Economic Indicators from 1991*, Retrieved 25 November 2009 from http://business.gov.in/indian_economy/eco_indicators.php
[15] Economy Watch, *Top World Economies*, Retrieved 11 November 2009 from http://www.economywatch.com/economies-in-top/

software industry is present in many advanced countries and its software exports have grown rapidly during the last few years.[16]

In a way India is a unique country. Economically it is different from China. China has been developing according to the same sequence as most Western economies: it began with the reform of agriculture and later moved to low-cost manufacturing. China has now started moving up to the value-added chain and in the next 20 years will become a global force in the service sector. India is growing from the opposite side. Its service sector comprises more than half of the country's economy. India's economy suffered heavily in the early 1990s for two reasons – a shortage of food and a shortage of foreign exchange reserves. The first was resolved through the green revolution and the second through higher export earnings, which in turn was partly the result of a more liberal trade regime.[17]

India's service sector has demonstrated the country's capacity to be a pioneer in the global economy, partly because of a vast pool of technical talent. India has a huge market potential in growing industries such as telecommunications and pharmaceuticals. These industries have made a great contribution to India's economic growth in the past years. Looking at the growth rates over last three years, India has certainly been one of the faster-growing markets. When most of the rest of the world was going through the meltdown of 2008–2009, particularly in the telecoms and semiconductor markets, India continued to turn in double-digit growth rates and to move up in terms of both its rankings and its rate of growth. One of the big differences between India and other Asian economies is that the Indian market, at least today, is less dependent on the manufacturing sector. Singapore, Malaysia, Taiwan and China grew up as manufacturing centres – low-cost and high-volume. India is strong in software, a service area that really requires communications and information technology (IT) infrastructure, which in many ways is more advanced in India than in most other Asian countries.[18]

India's economy is therefore expanding rapidly without having gone through a broadly-based industrial revolution. Its economic engine is powered not principally by its factories or the manufacturing of industrial products but by its competitive service industries. Thus the country's service sector has an economic weighting in line with mature developed economies, such as the United States and the UK.[19]

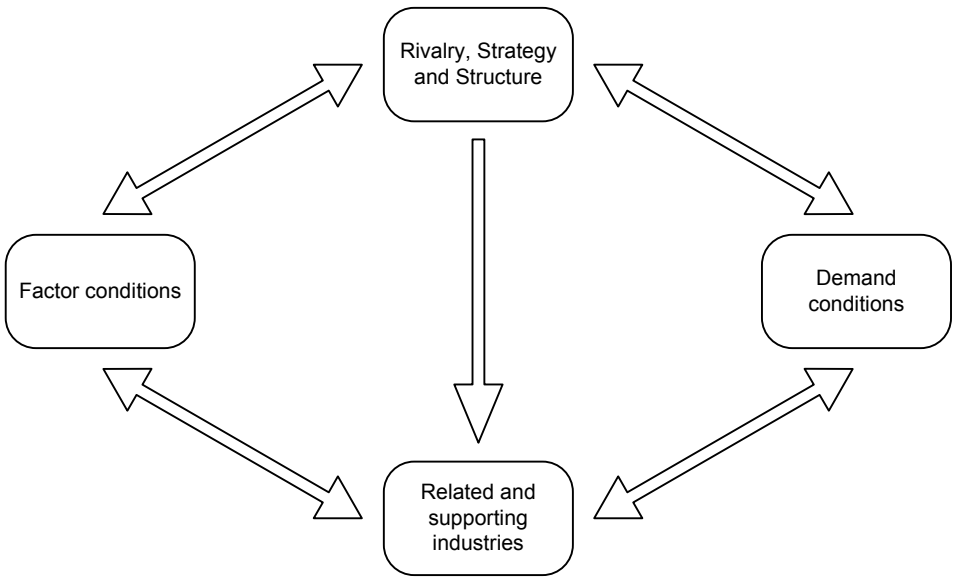
[16] Cohen, 2001, pp. 100-105
[17] Luce, 2007, pp. 37-39
[18] IBEF, *Investing in India…is a real competitive advantage*, Retrieved 5 November 2009 from http://www.ibef.org/artdisplay.aspx?cat_id=105&art_id=2013
[19] Luce, 2007, pp. 19-27

What are the factors shaping India's competitive advantages in service sector? According to Michael Porter[20] (Porter has written many books, among them "*The competitive Advantage of Nations"*) a nation should have a combination of different factors in order to become competitive on the global market. These factors together shape a "diamond" and will determine the competitiveness in the country. The determinants of national advantages are: **factor conditions** (human resources, natural resources, knowledge resources and capital resources) [21], **rivalry** (competition within the country) [22], **demand conditions** (home demand gives a specific industry or segments a clearer or earlier picture of what the buyers need) [23], and **related and supporting industries** (advantages in some related industries give potential advantages in many other industries, because they produce inputs that are widely used and that are important for innovation).[24]

According to Porter, a country will gain competitive advantages if the combinations of these determinants are favourable. If one or more factors weaken, the country will lose its competitive advantages. Even if the combinations of these factors are in favour of a nation, the factors should be upgraded constantly – for example, a state should upgrade the quality of its education, physical resources or other important infrastructure in order to stay competitive. The role of the state is thus very important, particularly in the creation of the factor conditions that are supported by the state by investments in important areas such as public and private educational institutions and research institutions. Nations succeed in industries and sectors where they are particularly good at creating and upgrading the factors needed.[25]

[20] M:E. Porter has written many books, among them "The Competitive Advantage of Nations"
[21] M.E. Porter, *The Competitive Advantage of Nations*, New York, Palgrave, 1998, pp. 73-83
[22] Ibid., pp. 115-120
[23] Ibid., pp. 86-90
[24] Ibid., pp. 100-102
[25] Ibid., pp. 73-83

Figure 1: The dynamics of national advantage



Source: Porter, p 139

How does India fit into Porter's description of a nation's competitive advantages? The fact is that India's manufacturing industry lags behind those of both the developed world and many Asian countries, such as China and South Korea. India's manufacturing sector generates only about 28 per cent of the country's total GDP, compared to 50 per cent in China.[26] There are a few reasons for India's manufacturing lagging behind its peer competitors. One is that India inherited a British form of manufacturing organization, which consisted of old and outdated plants, especially within the textile industry. The manufacturing sector was later organized according to the production line in the Soviet Union. India also introduced protective barriers in order to support its ageing industry. This meant that the manufacturing sector was not exposed to external competition,[27] which is essential according to Porter's theory of competitive advantages.

[26] Economy Watch, *Top World Economies*, Retrieved 11 November 2009 from http://www.economywatch.com/economies-in-top/

[27] R. Thomas, *India's Emergence as an Industrial Power*, Royal Institute of International Affairs, London, C. Hurst & Company, 1982, pp. 3-6

However, India's service sector fits well into the general picture, despite the many challenges facing this industry. India's competitiveness in services is partly due to technological advances. In today's knowledge economy, information and access to information have replaced traditional factor inputs such as land, labour and capital as the primary inputs into production. This transformation, caused by recent technological revolutions around the world, has presented enormous opportunities to developing countries. India appears to have successfully leveraged this opportunity and its large endowment of human capital to establish a fast lane to economic growth. Consequently India's IT industry has built a global reputation for quality, which has brought huge competitive advantages to the country.

India benefits from its English-speaking educated workforce and the time difference between India and the USA and Europe. India's English-speaking labour pool provided an early advantage in learning and reproducing programming languages that are written in English. In addition, labour cost advantages appear to be the most convincing factor endowment that worked in favour of India's software companies. This is partly because software development still remains highly labour-intensive, relying greatly on the knowledge and skills of the developers. Studies show that offshore Indian programmers cost only one-third those of the Western workforce. Low-cost, highly skilled software professionals are widely believed to be the key to India's success story.

2.3 India's Security Context and Concerns

India's distinct geostrategic setting is a factor that throughout its 62 years of independence has been a key determinant in the foreign and security policy formulation of the political elite. Projecting far into the Indian Ocean and surrounded by water, a considerable part of the subcontinent has no close neighbours. To the north, the mountain range of the Himalayas separates India from the central and eastern Asian landmass. But despite these natural barriers India has a poor record of fighting off foreign invaders.[28] Ever since the 15th-century Mogul invasion, the protective wall of mountain and sea has crumbled. The rise of European maritime dominance accelerated this process, opening the subcontinent to colonization, exploitation and European-style organization.

According to Drekmeier, the real "Great Wall of India" may instead have been its ability to protect and preserve a fundamental Indian civilization and to mitigate the cultural and social effect of foreign invasions by way of the caste

[28] Cohen, 2001, p.13

system.[29] This system of social division, even though it is hierarchical and intricate, has shown extraordinary ability to adapt and assimilate newcomers, high and low. The cultural and social organization of the castes has allowed the ancient Indian civilization to remain one of the great civilizations down to the present day.

Today the rise of India as a regional and global power is reinforced by its geostrategic weight. India now projects power, actively or passively, in a wide area, including the Indian Ocean, through which runs one of the world's most important maritime trade routes. India's power is also projected west, north and east into areas that were formerly part of the greater British India. To the west, Pakistan remains a key security concern. In its eastern sphere of influence Bangladesh remains an environmental and political powder keg. Burma, while not a major security concern, remains on the list of the world's most secluded and problematic dictatorships. Burma also borders India's problematic north-east territories, and the military regime's alliance with China presents India with additional problems.

To the north, friendly relations with Nepal and Delhi's security protégé, Bhutan, are overshadowed by the competitive and conflict-prone relationship with China, with which India also has unresolved border disputes. China today represents the most serious rival to India and it is mainly this rivalry that triggered the Indian nuclear weapons programme. In other parts of the larger region, Delhi will continue to assert its interest and expand its influence and importance. A current example is Afghanistan, where India will continue to be a factor in the regional balance affecting Kabul. But India will also be a key player in the long-term stability of the country.

Even though the regionalization of India's defence and security policy is a long-established phenomenon, the first decades of independence saw Delhi practising regional disengagement. On the global arena India took a posture of independence and neutrality vis-à-vis the two main rivals of the Cold War. This independent posture, however, was influenced by scepticism towards the United States and New Delhi's admiration for the ideal, if not the implementation, of the Soviet system. India has continued to practise a policy of global presence and global interest. In an era when New Delhi perceives unipolarity to be slowly giving way to multipolarity, fundamental features of India's global posture are being affected. China's rise and the waning of Russo-Soviet power have pushed India and the United States ever closer.

[29] C. Drekmeier, *Kingship and Community in Early India*, Stanford, Stanford University Press, 1962, pp. 69-80

2.3.1 Strategic Outlook and Indian Security Policy

The evolution of Delhi's strategic outlook has gone through several changes over the 62 years of independence. Yet distinct features remain and still influence India's strategic posture. The two most obvious are the disproportionately weak participation of the military in defence decision making, and the federal government's all-but-total exclusion of the individual states in defence matters.

These and other less obvious characteristics are a legacy from the immediate post-independence years. There is also the fact of the way in which Pakistani politics has developed. The scepticism of the first generation of Indian leaders towards all things military lives on in today's bureaucracy, which has been described as unwilling to let the Armed Forces take a larger role in defence decision making. Pakistan, with all its military coups, is viewed as a discouraging example of what military influence may bring.

The first 15 years of independence were shaped by Gandhi's non-violence movement and Nehru's sceptical attitude towards armed forces and their use. As mentioned earlier, the so-called Nehruvian tradition remained strong in India for a long time. This meant that India continued to take a two-pronged approach towards international relations and security matters. On the one hand, liberal idealism continued to play a distinctive role. In short, India felt that it could pursue core national interests without strong military power. Superiority in other areas of national power, it was believed, could raise India above the anarchical chaos of international relations.

At the same time, Nehru and his followers were nationalists and strong believers in the greatness of the Indian nation. In a sense, they where realists, stressing the geostrategic importance of the state's territory and linking it to core features of India's development. India could only thrive as the territorially defined nation it was. And India was a great nation. The notion of a "great nation" meant that India would have a natural great-power role to play.[30] Great nations would always produce great leaders. And nations with great leaders always had significant status and influence. By virtue of being a great nation, India "would do well by doing good".[31] This notion in turn gave Nehru and his followers a positive and opportunity-centric world view.

In defence matters Nehru accepted the Armed Forces as a necessary institution of the state but their use was to be very restricted. Military force was only to be used as a very last resort. The violent and hostile partition of the county in 1947 did little to change this fundamental view in India. In fact, Nehru and other Indian leaders seem at first to have regarded the partition as something temporary and built the policy of regional disengagement partly on that belief. Nehru is

[30] Cohen, 2001, p. 38
[31] Ibid., p. 40

reported to have said that Pakistan "would come back to us. None of us guessed how much the killings and the crisis in Kashmir would embitter relations".[32]

During these first ten tears of independence, the Armed Forces where neglected. Meanwhile, a new defence force had to be consolidated and a new higher officer corps educated. All this was to change in the early part of 1962. By way of over-confident military behaviour on part of New Delhi, and provocative policies on the part of both New Delhi and Beijing, the border controversy with China escalated into war in 1962. China crossed into India, met little resistance and advanced further than even the Chinese themselves had expected. The Chinese troops came to a halt of their own accord and then pulled back to what is still today the line of control. The failure of the Indian Armed Forces led to a major defence debate in India and a period of focus upon and building up of the neglected Armed Forces.

This period coincided with the increased US-Soviet tension and the Cold War formation of the post-war world. India in its foreign policy at the time pursued a policy of balancing between east and west. In ideological admiration of Moscow's socialist project, and in reaction to the Sino-Soviet rivalry coupled with China's warm relations with Pakistan and a deeply rooted scepticism towards the United States, India gravitated towards the Soviet Union. Although India never became a formal ally of the Soviet Union or part of the Warsaw bloc, relations between New Delhi and Moscow became good and trustful. Soon the Soviet Union was an important trading partner and a main supplier of arms to India.

By 1971, the Indian Armed Forces had evolved into a more modern and efficient force ready to prove itself able to deal with regional threats. The army build-up of the 1960s coincided with a shift in security policy thinking. Indira Gandhi, Nehru's daughter and prime minister between 1966 and 1977, did not reject the fundamental features of Nehru's main ideas of non-alignment and restricted use of the Armed Forces. But in the light of the 1962 war with China, the 1964 Chinese nuclear explosion and the 1971 war with Pakistan she developed a more threat-centric view of security issues as opposed to Nehru's opportunity-centric outlook.

The assessment of Pakistan had also changed. After the 1965 war over Kashmir India's political elite ceased to wish for the fragmentation and eventual collapse of Pakistan as its societal cement of Islamic identity disintegrated. On the contrary, Islamabad, despite its irregular democratic performance, had shown itself capable not only of resisting India but also of fighting the Indian Armed Forces to a standstill.

[32] Sankar Ghose, *Jawaharlal Nehru, A Biography*, Bombay, Allied Publishers Ltd, 1993, p. 161

As the 1970s advanced, India began to show a more anti-US stance. In the 1971 war, India had perceived the USA as supporting the Pakistani cause. This perception, coupled with improved US relations with China and Pakistan, was an important factor behind India's 1974 "peaceful" nuclear explosion. Throughout the 1980s, realism prevailed in government strategic planning also because of the increased threat and indications that Pakistan was on course to complete a nuclear weapon.

As the Cold War ended, India encountered a conundrum. Its trusted partner had vanished; the world seemed for the moment to be succumbing to unilateral dominance by a single superpower while India's regional rival, China, was sprinting ahead in terms of economic development. As the 20th century came to a close both India and Pakistan moved to become declared nuclear weapons powers. They engaged in a dangerous threshold crisis in 1999, the Kargil crisis, and there was a protracted crisis in their relations in 2001–02. These crises, the 9/11 terrorist attacks and the US wars in Afghanistan and Iraq, as well as the trend towards global "multipolarity", forced change in India. Relations with the USA were about to improve.

India's current grand strategy and defence strategy are challenging to assess. Unlike China, the United States, and several other countries, India has not yet produced a defence white paper or national security strategy on the political level.[33] It has, however, issued various military doctrines, some of which are available in the public sphere.[34] There is also an abundance of speeches and official websites outlining some of the national interests and strategies which India links to its security and defence.

According to the Indian chief of the Army Staff, General Deepak Kapoor, Delhi's security strategy and defence policy rests on two fundamental principles.

[33] Washington may have the most complex set of strategic white papers of any capital. The National Security Strategy (NSS) outlines the overall security strategy of the nation. The Quadrennial Defence Review (QDR) outlines the defence strategy. Subordinate to these are various defence doctrines, tailoring defence postures and military operational instructions to best serve the strategic objectives. Non-restricted versions of all these documents are made available in the public domain. For several years China has been producing a Defence White Paper that is made available in several languages. This white paper also makes statements about the overall strategic aims and objectives and the nature and limits of military power in securing these objectives.

[34] One example is *India Army Doctrine*, Retrieved 3 December 2009 from http://pksoi.army.mil/doctrine_concepts/Doctrine.cfm. The *Joint Doctrine of the Armed Forces* has also been released, but the document has not been found in the byways of internet searching. See *Joint Doctrine of the Armed Forces released*, Press Information Bureau, Government of India, Retrieved 2 November 2009 from http://pib.nic.in/release/release.asp?relid=17786. The Ministry of Defence of India also issues an annual report which has a chapter on the security environment. See Ministry of Defence, *Annual Report 2008/2009*, Government of India, New Delhi, 2008, Retrieved 5 November 2009 from http://mod.nic.in/reports/welcome.html.

First, India has "no extraterritorial ambitions".[35] Second, India has "no ambitions to transplant" its ideology on others.[36] To these negative principles can be added some general assessments about the world as seen from New Delhi. Although India sees more security challenges in its neighbourhood and is preparing for them by modernizing its Armed Forces, there is also recognition that what matters in national power today is not the same as what mattered during the Cold War. Economic power is seen as having a much greater influence today. The interrelated relations this creates on a regional and global scale mitigate threats and security concerns.

2.3.2 Key Security Challenges Today – International and Domestic

China

The extent to which India and China affect each other today cannot be overestimated and deserves far more attention than can be given to it in this report. To India, China is a competitor, a concern and a potential threat. At the same time, economic prospects could allow Indian and China to develop ties that will advance the prosperity of both plus deep mutual interdependence in the future.

Despite being separated by the Himalayan mountain range, India and China share many common historical experiences that should help them to achieve solid bilateral relations. They are two of the world's largest and most populous countries. Both were subject to Western imperialist domination during the 19th century and both achieved independence during the 20th century.[37]

Yet India has had a difficult relationship with China over the last 50 years. One of the main problems is the territorial disputes between the two countries. These disputes date back to the time when Great Britain signed an agreement with Tibet, giving the entire state of Arunachal Pradesh to London. This agreement was never accepted by the Chinese Government. When India achieved independence from the United Kingdom, Beijing saw its chance to claim back the territory. Consequently, China attacked India in 1962 and took over the entire state of Arunachal Pradesh in a war in which the Indian Army was defeated.[38] Strategically China remains a potential threat to India in the future.

[35] D. Kapoor, "Changing global security environment", in R. K. J. Singh (ed.), *India Defence Yearbook 2009*, Dehra Dun, Natraj Publishers, 2009, p. 59
[36] Ibid.
[37] Cohen, 2001, pp. 256.
[38] I. Kiesow, N. Norling, *The Rise of India: Problems and Opportunities*, Stockholm, Silk Road Studies Program, 2007, pp. 23-25

China's attack on India surprised the Indian Government and its leader, Nehru, and is said to have dealt a mortal blow to Nehru personally.[39] In 1964 China carried out its first nuclear test explosion, which forced India to reconsider its security policy in the region. India started its own nuclear programme, which forced Pakistan to do the same. Another implication from the war with China was that India came closer to the Soviet Union, which became a close ally of India in the region and a major supplier to it of defence-related material.[40]

There are also some disputes between India and China over water supplies from the Tibetan Plateau. Another important factor disturbing the relationship with China was Beijing's support for some militant organizations in the north-east, in states including Assam, Jammu and Manipur. And China's military and political support to India's regional enemy Pakistan has been another disturbing factor in Sino-Indian relations. In recent years, however, bilateral political and economic relations have been improving. Two-way trade has rocketed in the 21st century, and has reached around $40 billion annually. This is a huge improvement in relations between two countries which have long been suspicious of each other. China, however, still claims some parts of India's territory. [41]

Pakistan

Ever since the foundation of India and Pakistan in 1947, the relationship between the two countries has been complex. Territorial disputes and wars have dominated their relations. Consequently, diplomatic relations have been poor.[42] The first war between the countries occurred in 1948 over Kashmir. It ended with a ceasefire and the status of Kashmir remained undecided, which led the two countries to fight another war in 1965. A third war was fought in 1971–72. During this war, Pakistan was forced to accept the separation of East Pakistan, which became Bangladesh.[43]

In 1999, militant organization in Kashmir supported by Pakistan made incursions into Indian-administrated territory and yet another war, the Kargil war, broke out. Indian formations ultimately forced the Pakistani elements to withdraw from Indian-controlled territory after several months of intense fighting. The war, the first conflict after the nuclear tests by both countries conducted in 1998, exposed the dangers and the possibly catastrophic effects an armed conflict could now have. The rudimentary nuclear doctrines of both countries had not matured. The 2001–2002 crisis following terrorist attacks on the Indian Parliament in

[39] MANAS, *Independent India*, Retrieved 10 November 2009 from http://www.sscnet.ucla.edu/southasia/History/Independent/indep.html
[40] Kiesow and Norling, 2007, pp. 23-27
[41] Astill, 2008, pp. 3-15
[42] S. P. Cohen, "India and Pakistan: 'If you don't know where you are going, any road will take you there'", in K. Zetterlund (ed.), *Pakistan – Consequences of Deteriorating Security in Afghanistan*, Stockholm, Swedish Defence Research Agency, 2009, pp. 131-141
[43] Kiesow, Norling, 2007, pp. 23-25

December 2001 came closer to large-scale conflict than the contained Kargil war. As tensions finally eased in mid-2002 both countries found it in their interests to explore ways to reduce the tensions further through talks and consultations. This peace process up until 2008 served to stabilize the relationship.

Pakistan is still one of the major issues for India in its security policy. Islamabad's regional policy is a threat to India's national security and regional ambitions. In shaping India's security and foreign policy towards Islamabad, Pakistan is perceived as a country that lacks a rich cultural and civilizational inheritance. It is also regarded as being ruled by military dictatorship that supports reactionary elements in western Asia, and as a country that is unable to create a solid economic base and is dependent on foreign aid.[44]

Despite all its difficulties, Pakistan does not pose an existential threat to India. Although it has some superior tank formations, overall Pakistan's Army cannot compete with the numerically superior Indian Army. The conventional Indian force thus has a deterrent value against Pakistan. India is not only militarily superior to Pakistan. India's economy has grown rapidly the last 15 years. This gives India a competitive advantage that could be used to acquire more weapons.

Furthermore, the political dialogue between the two countries continues, despite the fact that India blamed Pakistanis for the terrorist attack in Mumbai in November 2008. The new Pakistani president, Asif Zardari, has been quite accommodating towards India. By labelling the Kashmiri militants as "terrorists", Zardari has annoyed the jihadists at home but improved relations with India.[45] Maintaining diplomatic relations does not, however, mean that the two countries are on a steady course of improved relations. Rather it is a function of the need to manage their relations in the face of the nuclear deterrent.

A few factors shaping the troublesome relationship between India and Pakistan have changed over time. The new environment opens the way for new opportunities and opportunities for diplomatic talks. For instance, India and Pakistan found themselves on the same side in the global war against terror after 11 September 2001. Both countries are worried about militant organizations getting too strong in each country.[46] Consequently both have been engaged in a comprehensive dialogue to resolve the territorial disputes.[47] It is also important to note that India is one of the few countries in the region that could play a constructive role in ensuring the stability of Pakistan.

[44] Cohen, 2001, pp. 203
[45] "Terror in India", *The Economist*, 29 November–5 December 2008
[46] S. P. Cohen et al., "India and Pakistan: 'If you don't know where you are going, any road will take you there'", in K. Zetterlund (ed.), *Pakistan – Consequences of Deteriorating Security in Afghanistan*, Stockholm, Swedish Defence Research Agency, 2009, pp. 131-141
[47] Kiesow and Norling, 2007, pp. 64-67

Terrorism and internal conflicts

India is a multicultural and multi-religious country, where among others Hindus, Muslims and Christians have been living mainly peacefully. Nevertheless, the country has experienced ethnic violence, especially in the north-east and north-west. The ethnic problems could be a result of discontent with the economic development of some regions. This, combined with other factors, such as the caste system, religion and language, has created an unstable situation for the government in New Delhi.

An attack on the commercial heart of India, Mumbai, in November 2008 shows that the country is struggling with internal conflicts and terrorism. In fact 2008 was a difficult year for India with many terrorist attacks in cities like Jaipur, Ahmadabad, Bangalore and Delhi. A "jihad movement" within the Islamic population has given rise to a terrorist organization, the Indian Mujahedeen that has caused anxiety in New Delhi.[48] Thanks to the political dialogue between India and Pakistan, the number of terrorism-related fatalities in Kashmir has been decreasing since 2001, but India still suffers from terrorist activities in eastern and north-eastern parts of the country.[49] In the eastern parts of the country, a Maoist militia, sometimes called the Naxalites, is challenging the government in New Delhi. According to a government official, this is one of the most serious challenges to India's internal security. The militia is disseminating its ideas to people in the countryside where poverty is widespread.[50]

Another aspect of terror activities is connected to information technology and its rapid development during the past decade. IT has created new opportunities for criminal and terrorist activities against a country's critical information infrastructure. Thus information technology has been used in periodic cyber conflict between India and Pakistan. Since 1998, there have been several conflicts between the two countries. For instance, a hacker group has been attacking the Indian Bhabha Atomic Research Centre's web page and changed the information on the website. Another incident is an attack conducted by Pakistani groups on the Indian Army's home page. Once again the content of the web page was changed to anti-India propaganda. Similar attacks have been conducted by Indian hackers on Pakistani authorities.[51]

After a ceasefire in cyber war, the conflict started again in November 2008 after the terror attack against Mumbai. The Pakistani hackers have admitted that they have been behind many attacks on the largest Indian banks. Despite the current ceasefire between the countries, there are risks that the cyber war will start again

[48] Astill, 2008, pp. 3-15
[49] South Asia Terrorism Portal, *India Assessment 2007*, Retrieved 16 November 2009 from http://www.satp.org/satporgtp/countries/india/index.html
[50] Astill, 2008, pp. 3-15
[51] R. Heickerö, *Cyber Antagonism between Hacker Groups Develops New Challenges*, Stockholm, Swedish Defence Research Agency, 22 October 2009, pp. 1-5

because these kinds of activities are fuelled by political, religious and national manifestations. The projection for cyber war activities is that they will grow over time and become more intense.[52]

Other challenges – poverty, infrastructure and energy

One of India's main weaknesses throughout the history has been its economy which has been singled out as a crucial problem. The problem is related to the strength of India's growth potential vis-à-vis its expanding population. It has been difficult to imagine how a relatively weak economy would provide resources for the vast majority of the population, let alone a modern military power. Thus feeding its people has historically been a major domestic issue for the government in New Delhi. India did not pay enough attention to this problem, or at least did not recognize the magnitude of it, during the Nehruvian era. Later, however, it was forced to take a more realistic view of its weak economic development, since the "Asian tigers" and China were leaving India behind in terms of manufacturing exports and economic growth.[53]

Despite the fact that the Indian economy has grown rapidly since the economic crisis at the beginning of the 1990s, the country still faces many internal difficulties. Many Indians still live in serious poverty. According to the World Bank, more than 400 million Indians live below the poverty line. That represents more than 40 per cent of the population. The number of poor people in India has fallen during the last 20 years, but the fact is that poverty is falling too slowly. One consequence of the poverty in India is that the country holds roughly about 40 per cent of the world's chronically malnourished children and more than 2 million children die every year.[54]

Another challenge for India is its huge population engaged in agriculture. About 65 per cent of Indians depend on agriculture for their livelihood, although the sector only represents 18 per cent of the country's GDP. This means that reducing poverty in the countryside will be very difficult. To do this, India needs huge economic growth in order to shift people from the agriculture sector to manufacturing and service industries. According to some estimates, it needs a growth rate of 8 per cent per year be able to cope with the transition. If India cannot find ways to reduce poverty, it may risk serious instability in the country in future.[55]

In recent years India has indeed been creating millions of jobs. Both the service and the manufacturing industries have been growing. However, one of the biggest problems facing India's future economic growth and political stability

[52] Ibid.
[53] Cohen, 2001, pp. 90-95
[54] Astill, 2008, pp. 3-15
[55] Ibid.

lies in the infrastructure sector. India's poor-quality infrastructure is hindering the possibility of growth in manufacturing. Investing in infrastructure will be one of India's big domestic issues, one that the government is fully aware of.[56] In the 11th Five-Year Plan 2007–2012 the government declares its ambition to increase investment in infrastructure. During the previous Five-Year Plan total investment in infrastructure was around 5 per cent of GDP. The aim of the government is to increase the share to 9 per cent of GDP.[57]

India is a growing economy and desperately needs to secure access to oil and gas supplies for the sake of its future economic growth. Access to supplies of raw materials will probably influence Delhi's foreign and regional policy. The growing domestic demand for energy is pushing India to find new sources of raw materials. India is heavily dependent on oil imported from the Middle East. It imports 70 per cent of the oil it consumes and the lion's share comes from the Middle East. India is therefore looking for alternative oil suppliers in order to reduce its dependence on Middle Eastern oil. Consequently, it is trying to get access to oil fields in Central Asia. India is in negotiations with Turkey to transport oil from Central Asia via Turkey to India. Turkey has offered to facilitate the supply of oil to India from Central Asia via Israel through a combination of overland pipelines and supertankers.[58]

Its rapid economic growth during the last 15 years has made India one of the world largest oil consumers. According to recently published statistics, it accounts for 3.4 per cent of the world's total oil consumption.[59] The projection for India's consumption of oil is that it will grow for the coming 15–20 years, while the oil consumption of Organisation for Economic Co-operation and Development (OECD) countries is expected to decline over the same period. By 2020 India will overtake Japan and becomes the world's third-largest importer of oil. The same scenario is applicable regarding India's imports of natural gas, which are expected to grow rapidly during the coming 20 years.[60]

[56] Ibid.
[57] Indian Planning Commission, D*evelopment of Infrastructure,* 11th five year plan 2007-2012, Chapter 12, Retrieved 17 November 2009 from http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v1/11v1_ch12.pdf
[58] S. Ramachandran, "Turkey offers oil pipe lifeline to India", *Asia Times*, 27 February 2008, Retrieved 17 November 2009 from http://www.atimes.com/atimes/South_Asia/JB27Df03.html
[59] BP*, Statistical Review of World Energy 2009,* Retrieved 19 November 2009 from http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622
[60] International Energy Agency, *World Energy Outlook 2009*, Retrieved 19 November 2009 from http://www.worldenergyoutlook.org/docs/weo2009/WEO2009_es_english.pdf

3 India's Defence Structure

The Indian Armed Forces are an all-voluntary force numbering in the millions. The active force is the third-largest in the world and, taken together with reserves and paramilitary forces, it numbers in excess of 3 million men and women (see section 3.3). As noted earlier, a salient feature of the Armed Forces is the low degree of participation of the military in higher politico-military decision making, be it in times of peace or war. Another feature is the low degree of integration between the three service arms. Only in matters of nuclear weapons and the defence of the Andaman Islands does India have joint service commands.

3.1 India's Higher Defence Organisation

The defence and security sector in India includes ministries and central government functions, various intelligence agencies, the Armed Forces of India and paramilitary formations. One branch of the bureaucracy, the Indian Administrative Service (IAS), dominates the higher echelons of the defence and security sector. IAS bureaucrats hold most posts at the Ministry of Defence (MoD) and fiscal matters are shaped by IAS personnel either at the Ministry of Commerce and the Ministry of Finance or seconded to the MoD from those two ministries.[61]

Another branch of the bureaucracy is also relevant to defence matters but in a more indirect way. The Indian Foreign Service (IFS) occupies posts and handles matters relating to Indian foreign policy.[62] Between the two services (IAS and IFS) there is some degree of competition. More importantly, however, both have a strong and inherited scepticism towards the military.

The Supreme Command of the Indian Armed Forces is held by the president but it is the Cabinet with the prime minister as its head that is responsible for national defence. The Cabinet Committee on Security (CCS) is the top policy formulation body in India in the defence area. The CCS comprises the ministers for finance, defence, and external and internal affairs.[63] None of the service chiefs takes part in defence decision making at the highest level, as is the case for example in the United States. The service chiefs can, however – like other specialists – be called upon to participate in CCS meetings. The CCS draws on a multitude of available bodies and functions for its decision-making process. The

[61] Civil Service India, *India Administrative Service*, Retrieved 29 November 2009 from http://www.civilserviceindia.com/Indian-Administrative-Service.html
[62] Civil Service India, *India Foreign Service*, Retrieved 29 November 2009 from http://www.civilserviceindia.com/India-Foreign-Service.html
[63] H. V. Pant, *India Negotiates Its Rise in the International System*, New York, Palgrave Macmillan, 2008, pp. 77-78.

National Security Council (NSC), the Cabinet Secretariat, different ministries and intelligence agencies are among them. The Armed Forces give their input to the CCS via the Ministry of Defence. There is no military representation on the CCS, but the service chiefs may be called on to advice it.

The NSC is subordinate to the CCS with an advisory function. It is also the government's primary coordinating body for security matters. The top tier of the NSC is manned by the prime minister, the deputy chairman of planning, the ministers for home affairs, finance, external affairs, and defence, the three service chiefs of staff, and the national security advisor (NSA). The NSA is also the private secretary to the prime minister. To help, he or she has a secretariat and an Advisory Board.[64] It was the NSC Advisory Board that was called upon to draft the first Indian nuclear doctrine.[65]

The Ministry of Defence is the main Cabinet ministry for defence matters but the Ministry of Finance also has substantial influence over defence matters. The MoD provides the policy framework and government policy directions on all defence and security-related matters to the Services Headquarters, inter-services organizations, production establishments and research and development organizations.[66] It consists of four departments – Department of Defence (DOD), Department of Defence Production (DDP), Department of Defence Research & Development (DDR&D) and Department of Ex-Servicemen Welfare – as well as a Finance Division.

The Armed Forces of India are formally not part of the government. Instead there are offices and functions "attached" to the Ministry of Defence.[67] The Chiefs of Staff Committee (COSC) is the only tri-service coordinating body giving advice to the minister of defence. Through the minister of defence, the COSC also advises the Cabinet in defence-related matters. The COSC is composed of the three chiefs of staff for the Army, Air Force and Navy.

As a secretariat, the COSC uses the Head Quarters of the Integrated Defence Staff (HQIDS), a relatively new function. The head of the Integrated Defence Staff (IDS) has the title Chief of Integrated Staff to Chairman, Chiefs of Staff Committee (CISC: see section 3.2 below). He heads the IDS and functions in a supportive role to the COSC, on which he also has a non-voting place.

---

[64] Apurba Kundu, *India's National Security under the BJP/NDA: "Strong at Home, Engaged Abroad"*, Brussels, European Institute for Asian Studies, June 2004, pp. 12, Retrieved 9 November 2009 from http://www.eias.org/publications/briefing/2004/kunduindia2.pdf

[65] Ibid., pp. 19-20

[66] Ministry of Defence, Government of India, *About the Ministry*, Retrieved 7 November 2009 from http://mod.nic.in/aboutus/body.htm

[67] Vijay Oberoi, "Need for holistic restructuring of the Indian military", *Journal of Defence Studies*, vol. 2, issue 1, 2008, Retrieved 9 November 2009 from http://www.idsa.in/jds/2_1_2008_NeedforHolisticRestructuringoftheIndianMilitary_VOberoi

The CISC supervises the Integrated Defence Staff, chairs all multi-service bodies and the Defence Crisis Management Group (DCMG), and is also responsible for the coordination of long-range plans, five-year plans and annual budget proposals of the three services in consultation and coordination with the Integrated Services Headquarters.[68]

3.2 The "Jointness of Forces" Debate

The actual and perceived shortcomings of India's higher defence organization were exposed publicly by the Kargil war. The lack of civil-military coordination in decision making as well as lack of service "jointness" was highlighted in official review commissions and debated widely in the public domain. As implementation of some of the key recommendations given in the early years of the decade is still pending, debate continues. Most notably this debate centres on the inability of India to create a chief of defence staff (CDS) function headed by a five-star general (equivalent) superior to the three service chiefs.

Following the Kargil conflict of 1999, a committee headed by Shri K. Subramanyam, commonly known as Kargil Review Committee (KRC), was set up on government orders. Its task was to "review the events leading to Pakistan aggression in the Kargil district of Jammu & Kashmir and to recommend such measures as are considered necessary to safeguard National Security against such armed intrusions".[69] Following the release of the full classified report in December 1999 an unclassified version was submitted to the Parliament in February 2000.

According to the committee there was serious lack of synergy among the three services. Apart from that, there was also lack of coordination between the Armed Forces and the civil authorities. The failure to share intelligence inputs between the three services and the civil intelligence agencies had "further aggravated the situation".[70] Once the KRC report had been submitted, a Group of Ministers (GoM) was set up to review the national security system in its entirety. It was to consider in particular the recommendations of the KRC and formulate proposals for their implementation. The GoM report was submitted to the government in early 2001.

---

[68] Ministry of Defence, Government of India, *About the Ministry*

[69] Standing Committee on Defence, Ministry of Defence, *Status of Implementation of Unified Command for Armed Forces Thirty Sixth Report*, 2009 The List of references places this under L – Lok Sabha, *Status of Implementation of Unified Command for Armed Forces Thirty Sixth Report*, New Delhi, Standing Committee on Defence, Ministry of Defence, 2009, p. 2, Retrieved 7 November 2009 from http://164.100.47.132/committeereports/Defence/36th%20Report-UNIFIED%20COMMAND.pdf.

[70] Ibid., p. 3.

The CCS approved most of the GoM report's recommendations. One issue, however, was omitted. This concerned the creation of a CDS to integrate into one function joint planning and coordination between the separate service arms. The CCS passed the decision up to the government, which decided to conduct political consultations with several national parties. To resolve the acute issues pertaining to jointness, as an intermediate step, an Integrated Defence Staff was created. Its HQ was headed by a four-star general (equivalent), the CISC. The decision to appoint a CDS has since been kept pending. Critics point to the suboptimal performance of the higher defence organization as an argument. One assessment already made by the GoM report of 2000 is often repeated. It states that the "functioning of the COSC has, to date, revealed serious weaknesses in its ability to provide single point military advice to the government, and resolve substantive inter-Service doctrinal, planning, policy and operational issues adequately. This institution needs to be appropriately revamped".[71] Likewise, according to the critics, the IDS has not been able to improve jointness or civil-military interaction in higher decision making.

The answer to the question why the long-standing recommendation on a CDS has not been implemented can be found in bureaucratic rivalry and in the still inherent scepticism about military involvement in political affairs. The introduction of a CDS, according to one analyst, is simply a "too radical change to existing civil-military relations in India" and political parties are "worried at the power the post would carry".[72] This observer goes on to say that the three services also bear responsibility: "…vested interests in the three defence services seeking to protect their spheres of influence" are a strong factor hampering the CDS reform. Disappointed advocates of a CDS have complained that the failure to create this post has left the "fledging integrated defence staff and the much-touted objective of promoting 'jointness' in operational planning among the armed forces 'totally rudderless' and without any 'strategic guidance'".[73] To these two explanations can be added a third, the resistance of the civil service bureaucrats of the IAS and IFS to letting the military expand its role within the government.

Thus three strong forces have interests that work against the CDS reform. It will take more time and perhaps more crises before the CDS reform can be fully implemented.

---

[71] Assessment made in the GoM report of 2000 as quoted in A. Prakash, "India's higher defence organisation: implications for national security and jointness", *Journal of Defence Studies*, vol. 1, issue 1, 2007

[72] A. Kundu, *India's National Security under the BJP/NDA: "Strong at Home, EngagedAbroad"*, Brussels, European Institute for Asian Studies, June, 2004, Retrieved 9 November 2009 from http://www.eias.org/publications/briefing/2004/kunduindia2.pdf

[73] Ibid.

3.3 The Armed Forces and Services Modernization

The Indian Armed Forces have 1,288,000 active troops, some 1,155,000 reserves and 1,300,586 paramilitary forces, according to an Indian source.[74, 75] *The Military Balance 2009* puts the number of troops at 1,281,000 active servicemen, 1,155,000 reserves, and 1,301,000 in various paramilitary forces.[76] Numerically this gives India the third-largest active force in the world after China (with 2,185,000 active troops) and the United States (with 1,540,000).

In recent years, and especially since the gradual warming of relations with Pakistan after the 2002 crisis, the Indian Armed Forces have been able to shift the focus away from Pakistan. On the strategic level, countering China's military build-up has been a major thrust. There has been a process of transforming the capability of the defensive border formations. Independent offensive capability through stand-off weaponry, information superiority and precision strike assets has been prioritized. The objective has been a strong conventional deterrent force that supplements the nuclear deterrent of India.

In the north-east India region of Arunachal Pradesh, airfields have been opened and the construction of infrastructure in support of the defensive border formations has accelerated. These are projects that increase operational efficiency, the sustainability of the formations, and the capability to insert additional formations into the areas opposite China. Improving strategic reach capability by the Air Force has been critical.

Maritime security in the Indian Ocean has been another focus. India's vital interest in expanding its influence into its immediate maritime surrounding areas, its vital interests in transport and the will to be able to counter Chinese maritime competition in the Indian Ocean have spurred a naval modernization and build-up.

This naval modernization is coupled to the overarching push to acquire force projection and out-of-area operations capability. Several key modernization programmes such as aircraft carriers, nuclear-powered submarines, a long-range strike capability, troop carriers and so on point in this direction.

The ambitious modernization plans and re-focusing of the Armed Forces have yet to produce a substantially improved national military asset. There are several

[74] R. K. J. Singh (ed.), *India Defence Yearbook 2009*, Dehra Dun, Natraj Publishers, 2009, p. 222
[75] Reserves include the Border Security Forces (208,422), the State Armed Police (450,000), the Central Industrial Security Forces (94,347), and various special regional forces (Assam Rifles etc.) 201,761.
[76] International Institute for Strategic Studies (IISS), *The Military Balance 2009*, London, IISS, 2009, p. 449

problems that have been pointed out by many analysts. Continued reliance on large quantities of inferior matériel, from battle tanks that lack night capability to inferior equipment in the Special Forces, has been a constant grievance. The problem of operational efficiency posed by the lack of service jointness and synergy has been another monumental issue of concern. A third problem has been that of service personnel exhaustion due to extensive deployments on internal stabilization missions and COIN (Counter Insurgency) campaigns within India itself. These are only some of the problems that were already being discussed before the 2008 Mumbai attacks.

The terrorist attacks in Mumbai exposed highly troubling shortcomings of the Indian Armed Forces that have since led to yet another shift in the focus of service modernization and force reformation.[77] First of all, perceived Pakistani involvement in the attacks has led to the focus again gravitating towards the threat posed by Pakistan. What in India was perceived as a return to the irregular methods used by Pakistan against India so many times has triggered thinking on how the combination of Pakistan's superior strategic focus should be countered.

National intelligence-armed service coordination did not work. The Indian Navy failed to find the terrorists in spite of having information about their whereabouts from the national intelligence organization. The Special Forces did not perform up to standard due to equipment shortages, lack of proper training and poor organization. In a broader sense, the Armed Forces failed to respond in a coordinated and decisive manner. This cast into serious doubt the claimed "full spectrum" operations capability, from special operations and counter-insurgency, to fighting a conventional war to nuclear war.

3.3.1 The Army

The Indian Army is by far the largest service branch. Numbering 1,100,000 men according to the *Indian Defence Yearbook 2009*, it dwarfs the Navy and Air Force.[78] The Army is organized into five regional commands:

- Central Command at Lucknow
- Eastern Command at Kolkata
- Northern Command at Udampur
- Western Command at Chandimandir
- Southern Command at Pune

[77] "Homeland defence: India Country Brief", Jane's, 19 January (2009), Retrieved 22 April 2010 from http://www.janes.com
[78] Singh, 2009, p. 222

The Indian Army website likens the commands "to a Field Army or even an Army Group Headquarter with a General Officer Commanding-in-Chief presiding over matters in the rank of a (three-star) Lieutenant General".[79] Below this the Army is organized into field formations grouped into corps with several divisions under them.

The Army has been and is increasingly being given multiple tasks. The defence of Indian territory is the most obvious, but the Army has always been and still is involved in internal security functions more than is usual in most other countries. This means that it must master several different operational and tactical concepts. Large-scale mechanized warfare, high mountain operations, low-intensity asymmetric warfare and counter-insurgency operations are some of these.

To bolster its ability to defend the northern borders with China along the 4000 km-plus actual line of control, the Army has been authorized to raise two more mountain divisions, bringing the total up to 12 from the current ten. Parallel to this is the development of infrastructure to improve its ability to manoeuvre close to the border with China in the various border areas.

The Army's equipment varies a great deal. The chief of army staff characterizes it as a "mix of vintage, contemporary and futuristic technologies….normally…a 30/40/30 concept".[80]

3.3.2 The Air Force

The 125,000-troop strong Indian Air Force has around 565 combat aircraft and approximately 785 transports, trainers, reconnaissance aircraft and helicopters.[81] All in all this gives India a force of around 1,350 aircraft, making it one of the top five air forces in the world. Broken down by type, the Air Force has 96 fighter aircraft, 392 fighter ground attack aircraft, 237 trainers, 261 transport aircraft, three AEW/AWACS (airborne warning and control system aircraft), six tankers, and 20 attack and 258 support helicopters, according to the *India Defence Yearbook 2009*. As of mid-2000, the Indian Air Force had embarked on a major upgrades and expansion in the near to medium-term future.

[79] Official website of Indian Army, *Command and Control*, Retrieved 2 November 2009 from http://indianarmy.nic.in/Site/FormTemplete/frmTemp1PRM3C.aspx?MnId=HvLJ2i8KsX4=&ParentID=H1aVkriO4/g=
[80] Singh, 2009, p. 60
[81] Ibid., p. 228

The Air Force has five operational commands:

- Western Air Command at New Delhi;
- Southwestern Air Command at Jodhpur
- Eastern Air Command at Shillong
- Central Air Command Allahabad
- Southern Air Command at Thiruvananthapuram

Two functional commands, a training centre and a Maintenance Command also exist.

Squadrons are the mainstay of the Air Force and India has recently moved from 32 to 34 squadrons. These are composed of various types of aircraft such as fighter, bomber, transport, communication and reconnaissance. The Air Force also has a large Maintenance Corps that provides storage, custody, maintenance of supply, and repair and overhaul of Air Force equipment. There are also training units, and command and control units.

The tactical aircraft fleet of the Indian Air Force is a mix of various types. It includes Soviet MiG-21s, Mig-23BN/UMs, MiG-27s, MiG-29s and Sukhoi-30s together with British/French SEPECAT Jaguars and the French Mirage 2000. The Su-30s and the Jaguar are licence-built in India.

The Air Force has proved itself as a capable and large-capacity air lift organization. The Il-76 and An-32 fleet has served India well as such and this fleet is now being upgraded to continue to provide air lift. India also employs BAe HS-748, Do-228, B-707 and B-737 aircraft in its transport fleet.

3.3.3 The Navy

The Navy currently has a force of 131 warships. These include one aircraft carrier, 48 other major combatants and 16 submarines, making it one of the five largest navies in the world. These ships are operated from the two major naval bases at Mumbai and Visakhapatnam.

India's naval aviation incorporates the latest aircraft available in India. One squadron (15 aircraft) of Sea Harriers makes up the mainstay of the combat air fleet. The largest naval air function is the anti-submarine force. Its main force is made up of six squadrons (60 helicopters).[82]

India has produced many ships of indigenous design and has a good shipyard capacity. Indian ships do well in comparison to equivalent ships built by other

[82] Ibid., p. 226

advanced countries. The Navy also has modern dockyard facilities at its disposal. Its strength is considerable and it has a number of very good ships. However, the Navy's force overall is ageing rapidly and several of its platforms are outdated. The new ten-year modernization plan has been tailored to get to grips with this problem.

3.4 Nuclear Forces and Deterrence Posture

Even though India performed its "peaceful nuclear explosion" as early as 1974, it was with the tests of 1998 that it declared its status as a nuclear weapon state to the world. Since then, this status has been reinforced on several levels; a doctrine has been formulated, a formal command and control structure has been organized, and substantial technical advances have been demonstrated. India seems well prepared for using its potential for nuclear deterrence as one means in its rise in the global world order.

India has not officially declared the size of its arsenal, either in terms of warheads or in terms of platforms. An arsenal of around 70 nuclear warheads is usually assumed to be available,[83] which is on par with Pakistan's holdings, but smaller than China's. The nuclear effort has been under strong civil control in India since its start, and ultimate control still rests within the political-civil sphere, although the transition towards an operational capability since the tests in 1998 has meant an increase in the influence of the Indian Armed Forces.

Control of the Indian nuclear arsenal rests with the Nuclear Command Authority (NCA).[84] The NCA has two councils, the Political Council and the Executive Council. It is the Political Council, headed by the prime minister, which may authorize use of the arsenal. The membership of this council has not been officially declared, but its members are thought to be the national security advisor and the members of the CCS, i.e. the ministers for finance, defence, and external and internal affairs.[85] The Executive Council executes the directives of the Political Council and provides input for decisions. It is headed by the national security advisor, and other members are the heads of the armed forces, in particular the chairman of the COSC, and the heads of the intelligence and

[83] Estimates of the size of India's nuclear warhead arsenal can be found in Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook 2009*, Oxford, Oxford University Press, 2009, pp. 367-371, and R. S. Norris and H. M. Kristensen, "Nuclear notebook: India's nuclear forces, 2008", *Bulletin of the Atomic Scientists*, November/December 2008, vol. 64, no. 5, pp. 38–40

[84] Prime Minister's Office, "Cabinet Committee on Security reviews progress in operationalizing India's nuclear doctrine", Press Release, 3 January 2003, Retrieved 8 December 2009 from http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html

[85] H. V. Pant, *India Negotiates its Rise in the International System*, New York, Palgrave Macmillan, 2008, pp. 77-78.

research agencies. The Strategic Forces Command, which constitutes the operational nuclear capability of the Indian Armed Forces, reports to the COSC.

In January 2003 the CCS declared India's nuclear doctrine and a summary was released to the public.[86] At the heart of this doctrine is the clear statement of No First Use; thus the arsenal is aimed to constitute a credible second-strike capability. India's nuclear arsenal will moreover not be used against non-nuclear weapon states unless India is attacked on a large scale with biological or chemical weapons. Authorization for use is given by the civil political leadership and executed through the NCA. Finally, the doctrine states that India will continue its moratorium on nuclear weapon tests and implement strict export controls to support non-proliferation efforts, both these commitments being in line with India's ideal of a nuclear weapon-free world.

For the time being, India aims at a nuclear triad. Today, the capability may be said to rest on two and a half legs. The available platforms for operational nuclear weapon delivery are aircraft together with short- and intermediate-range ballistic missiles. One version of a short-range ballistic missile can probably already be launched from surface ships. The first nuclear submarine of the advanced technology vehicle (ATV) programme underwent its first sea trials in the summer of 2009.

Today there is thus already a diversity in platforms (i.e. in terms of types, ranges, payload, and fuel), which makes the nuclear capability more credible. This existing diversity will increase by further development of warheads and missiles (longer ranges, better accuracy) and cruise missile technology. India's space efforts may radically increase its surveillance capabilities, necessary both for accurate targeting and as support for the missile defence that is under development. In the long term, the credibility of the second-strike capability will be increased if India launches a small fleet of (three or four) strategic submarine and if the programme for missile defence is successful.

3.5 Key Modernization Projects

India is set to spend huge sums of money on modernization of its matériel within all the three services. In general terms, these modernization efforts focus on weapons that increase firepower, manoeuvrability and speed, surveillance, command and control, and precision-guided munitions.

[86] Ministry of External Affairs, "The Cabinet Committee on Security reviews operationalization of India's nuclear doctrine", Press release, 4 January 2003, Retrieved 17 November 2009 from http://www.meaindia.nic.in/. A draft version released by the National Security Advisory Board in 1999 is available at http://www.indianembassy.org/policy/CTBT/nuclear_doctrine_aug_17_1999.html

3.5.1 The Army

Artillery: The Army is acquiring new field artillery guns, of several types. One category is an ultra-lightweight 155mm air liftable field gun. Another is a light-weight self-propelled 155mm howitzer.

UAVs: The Army is looking to buy a large force of small and very small portable unmanned aerial vehicles (UAVs) both for intelligence gathering and to be used in a “killer” role. The main time frame for introducing these is 2012 to 2017.

Air defence: The Army is also looking to upgrade its air defence. Both missiles and guns are being considered.

Infantry upgrades: New carbines as well as other technical enhancements are being planned for infantry soldiers.

Amour: The Army is upgrading its armoured force with the indigenously produced T-90 battle tank. The first batch was delivered in 2008. It is also looking to upgrade the T-72 tanks with new thermal imagery.

Helicopters: A new light helicopter to replace the 1970s-vintage Army and Air Force aviation helicopters.

Anti-artillery radar: The Army is acquiring new weapons-locating radars to be used to track and locate enemy artillery. It is an indigenous radar and is at an advanced stage of development.

Tactical communications: A new tactical communications system to replace the 1980s-vintage system is being acquired.

3.5.2 The Navy

The Navy’s ten-year modernization plan envisages the production of around 75 new warships to complement or replace the fleet’s existing 131. Hitherto the replacement of ships and aircraft has not been adequately funded and the fleet is therefore ageing faster than it can be modernized. The new ten-year plan is intended to alleviate this. Among the planned acquisitions are new submarines, a new frigate class, new bunker ships, an aircraft carrier and a new fleet tanker. India has also ordered three nuclear-powered attack submarines of Russian construction, the Akula/Project 971. The three are being built in Russia.

The Navy is also looking to enhance airborne maritime surveillance. A three-tier system is envisaged where UAVs are used for short-range, medium-range and long-range capability. Platform capabilities already exist but refurbishments are being made and planned. Some more medium-range platforms are also being produced indigenously.

The Navy has also taken upon itself to acquire littoral warfare capability, including amphibious warfare ability. Landing craft and helicopters for specific amphibious use are being ordered.

3.5.3 The Air Force

Several medium fighter aircraft of the Indian Air Force are approaching the end of their life and will be phased out. This has prompted the Indian Government to take two measures. One is the acquisition of 126 medium multi-role combat aircraft, where the Swedish JAS 39 Gripen is one contender together with, among others, the French Rafale. The other measure is signing an agreement with Russia to jointly develop a fifth-generation aircraft.

The Air Force has also ordered 40 SU-30 MKIs from Russia to supplement the existing 60 SU-30 MKIs India is already operating. Several upgrades to existing aircraft are also planned, including those for the air lift fleet of Il-76 and An-32 transporters.

The indigenous Indian light combat aircraft (LCA/Tejas) project has encountered many difficulties and the aircraft is not expected to be operational before 2015.

4 India's Defence Research and Defence Industry

India is one of the world's top ten countries in terms of defence expenditure and is the third-largest importer of military hardware. India's cumulative imports of military hardware are expected to double to more than $30 billion by 2012 and to climb further to $80 billion by the end of its 13th Five-Year Defence Finance Plan 2022.[87] India has the ambition, manifested through its spending on defence research and development and such policies as "buy and make (Indian)", to gain knowledge and transfer technology in order to develop an indigenous defence technology and industrial base.

4.1 Defence R&D

The Defence Research and Development Organisation (DRDO) was established in 1958 and was assigned with assisting India's defence industry with military equipment R&D. It was an amalgamation of the Technical Development Establishment (TDE) of the Indian Army and the Directorate of Technology Development and Production (DTDP) with the Defence Science Organisation (DSO). By the end of 1961, the number of DRDO laboratories had reached 21. The DRDO laboratories subsequently developed into facilities for production of weapons, sensors, sighting, communications, and so on.[88]

Today, the DRDO has roughly 50 laboratories and establishments financed by the government. The Indian defence R&D budget has accounted for 5–6 per cent of the total defence budget in recent years. Defence procurements based on DRDO technologies are a meagre 2–3 per cent of the annual defence capital acquisition budget.[89] The financing of the DRDO has thus been relatively modest and the Parliamentary Standing Committee on Defence has recommended that the defence R&D budgetary allocation should be at least 14–15 per cent of the total defence budget.[90] With an increased R&D budget, the government hopes to achieve its goal of 70 per cent indigenous production versus 30 per cent imports.

The DRDO is the province of the Department of Defence Research and Development of India's Ministry of Defence. Its R&D tasks include development of weapons systems and it is assigned with enhancing Indian self-reliance in such

[87] R. Bedi, "India keeps shooting itself in the foot", *Jane's Defence Weekly*, 14 October 2009
[88] S. Pal and W. Selvamurthy, *Capacity-Building in Defence Science and Technology: A Perspective from the DRDO*, Strategic Analysis 32:2, 2008, London, Routledge, pp. 259-284
[89] Ibid.
[90] Indian Ministry of Defence, *Standing Committee on Defence (2006-07) Fourteenth Lok Sabha, 'Defence Research and Development Organisation (DRDO)'*, March 2007, Retrieved 24 November 2009 from http://164.100.24.208/ls/CommitteeR/Defence/14threport.pdf

development. The DRDO's R&D operations include various areas of military technology such as aeronautics, armaments, combat vehicles, electronics, instrumentation engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences.[91] Its three major responsibilities are to

- design, develop, and lead to production of state-of-the-art sensors, weapon systems, platforms, and allied equipment for India's Armed Forces;
- provide technological solutions to the services to optimize the combat effectiveness and promote the well-being of the troops;
- develop infrastructure and committed, quality manpower and build a strong indigenous technology base.[92]

The DRDO has had a key role in the development of, for example, the Arjun main battle tank and the Tejas multi-role jet fighter. Generally the DRDO can be regarded as more of a design bureau and developer of military equipment than its European counterparts.

The DRDO budget is divided into a number of segments, namely development of strategic systems (35 per cent), development of technologies, systems, products and equipment (30 per cent), infrastructure, special facilities, ranges, equipment, works, maintenance, etc. (15 per cent) and science and technology projects given to universities and academic institutions (5 per cent). Salaries and human resources development account for the remaining 15 per cent.[93]

The total strength of the DRDO is about 30,000, with 7,000 scientists, 13,000 technical personnel, and 10,000 administrative and support personnel. Today, it is the country's premier technology generator and system developer.[94] India's Defence Procurement Procedure (DPP) of 2006 allowed foreign companies to form joint ventures in India and invest in Indian defence R&D organizations.[95] Foreign firms have, however, been visibly reluctant to invest and partner with the DRDO in defence R&D. One reason for this is the DRDO's alleged lack of focused research and development.[96] The DRDO is often faced with problems of transfer of technology due to the limited engineering, production, and technology

[91] Defence Research and Development Organisation website, Retrieved 23 November 2009 from http://www.drdo.org/
[92] Pal and Selvamurthy, 2008, pp. 259-284
[93] Ibid.
[94] Ibid.
[95] L. K. Behera, *India's Defence Offset Policy*, Strategic Analysis 33:2, London: Routledge, 2009
[96] N. Neihsial, *What Is Wrong with India's Defence Industrial Policy?*, IDSA, 22 August 2008, Retrieved 24 November 2009 from http://www.idsa.in/idsastrategiccomments/WhatiswrongwithIndiasDefenceIndustrialPolicy_NNeihsial_220808

absorption capabilities of the Indian industrial sector. Another huge challenge for the DRDO is to attract and retain competent scientists as the competition with multinational corporations over personnel is intensifying.[97]

It is possible that the DRDO will be subject to a structural overhaul due to problems with on-time delivery and cost overruns in several projects. In March 2008, the P. Rama Rao Committee submitted a report suggesting a transformation of the DRDO to Defence Minister A. K. Antony. The report identified a need for better synergy between the DRDO and the Armed Forces, and a reduction in the numbers and rationalization of laboratories, as well as greater interaction and collaboration with the industry. It suggested a more focused approach, on 10 to 14 critical projects such as missiles, anti-missile systems, light combat aircraft, aero engines, electronic warfare, and high-altitude weaponized unmanned aerial vehicles.[98]

4.2 India's Defence Industrial Policy

India still has an underdeveloped military-industrial complex, and about 70 per cent of defence equipment, mostly of high value and high technology, is currently imported. Despite years of effort, the extent to which India is "self-reliant" in defence production lingers in the range of 30 to 35 per cent.[99] Its private sector accounts for around 20 per cent of India's defence industry market.[100]

Approximately 70 per cent of the imports are of Russian origin.[101] Imports from Russia include naval guns, towed guns, surface-to-surface missile (SSM) launchers and multiple-rocket launchers. Other defence equipment exporters to India include Israel (towed guns and mortars), Italy (naval guns), Sweden (towed guns), Poland (armoured recovery vehicles, ARVs), Slovakia (ARVs), South Africa (armoured personnel carriers, APCs) and the UK (airborne early warning, or AEW, systems).[102]

---

[97] Pal and Selvamurthy, pp. 259-284

[98] R. Sharma, "Overhaul of DRDO likely", *The Hindu*, 26 May 2008, Retrieved 2 March 2010 from http://www.thehindu.com/2008/05/26/stories/2008052659721100.htm

[99] L. K. Behera, *Tata's Forays into Defence Production*, Institute for Defence Studies and Analyses, 17 June 2008, Retrieved 20 November 2009 from http://www.idsa.in/idsastrategiccomments

[100] B. Majumdar, "India says to buy 70 pct defence equipment locally", Reuters, 20 August 2009, Retrieved 14 December 2009 from http://in.reuters.com/article/topNews/idINIndia-41865220090820

[101] B. K. Singh, *Consolidating India's Military-industrial Complex*, ipcs.org, 4 October 2005, Retrieved 24 November 2009 from http://www.ipcs.org/article_details.php?articleNo=1853

[102] L. K. Behera, *Revitalising the Ordnance Factories*, IDSA, 28 August 2009, Retrieved 9 December 2009 from http://www.idsa.in/event/RevitalisingtheOrdnanceFactories_lkbehera_090828

During the initial years after independence in 1947, India's defence industrial policy was guided by the term "self-sufficiency". This term was subsequently modified to "self-reliance" in defence production and has become a matter of varied interpretation. While for some it means the ultimate objective of complete non-dependence on imports for defence hardware, for others it means selective self-sufficiency in certain critical technologies. And for some others it is a simple reduction in the ratio of imports to indigenous sources of supply to the Armed Forces.

India's defence industrial policy broadly consists of three components: (1) maximization of indigenous manufacturing and production; (2) licensed production of what could be obtained from abroad; and (3) direct purchase of equipment not covered by the other two categories but considered essential for ensuring security.[103]

4.3 India's Military-Industrial Complex

India's military-industrial complex is dominated by eight state-owned companies, known as public sector undertakings (PSUs). On top of these, there are 40 state-run ordnance factories (OFs) manufacturing equipment for the Armed Forces. Nearly 50 R&D laboratories under the DRDO provide support. Since 2001, private Indian companies have also been allowed to produce defence items.

More than 140 companies are involved in the development of about 345 defence products, according to the Confederation of Indian Industry (CII).[104] India's defence industry can be divided according to five product categories, representing various stages of the supply chain: (1) producers of raw materials; (2) producers of IT services and equipment; (3) producers of automotive equipment; (4) producers of test equipment and maintenance services; and (5) producers of major subsystems and assemblies for highly complex major defence systems.[105]

The Department of Defence Production (DDP) deals with matters involving defence production, indigenization of imported stores, equipment and spares, and

[103] Neihsial, *What Is Wrong with India's Defence Industrial Policy?*
[104] N. Neihsial, *Is India on the Path to Vibrant Defence Industry?*, Institute for Defence Studies and Analyses, 8 October 2008
[105] N. Gupta, *Will Indian Defence Private Sector Deliver with Recent Policy Changes?* IDSA, 24 November 2009, Retrieved 27 November 2009 from http://www.idsa.in/idsacomments/WillIndianDefencePrivateSectorDeliverwithRecentPolicyChanges_ngupta_241109

planning and control of departmental production units of the Ordnance Factory Board and the defence public sector undertakings (DPSUs).[106]

The implementation of the offset policy of the Ministry of Defence is facilitated by the Defence Offset Facilitation Agency (DOFA), which comes under the DDP.[107]

4.3.1 The DPSUs

There are eight state-owned DPSUs.[108] They were set up in order to build a strong and diversified production base capable of supplying technologically up-to-date weapons and equipment. They were established under the administrative control of the Department of Defence Production and Supplies.[109] The DPSUs are:

- Hindustan Aeronautics Limited (HAL)
- Bharat Electronics Limited (BEL)
- BEML
- Mazagon Dock Limited (MDL)
- Garden Reach Shipbuilders & Engineers Limited (GRSE)
- Goa Shipyard Limited (GSL)
- Bharat Dynamics Limited (BDL)
- Mishra Dhatu Nigam Limited (MIDHANI)

A further description of the DPSUs can be found in Appendix 5. Traditionally it has been the DPSUs and not private industry that have been responsible for the manufacturing of defence systems in India. This is true both for indigenously developed systems such as the Tejas aircraft and for licensed production, for example, the SEPECAT Jaguar, both manufactured by HAL.

The focus on the DPSUs is probably one reason why India and the Indian defence industry, despite its unquestionable size and resources, have not joined the rest of the world's defence industry on the export market. Most countries with an indigenous defence industry have found it necessary to specialize in a

[106] Indian Ministry of Defence, Department of Defence Production, *About the Ministry*, Retrieved 3 November 2009 from http://mod.nic.in/aboutus/body.htm#as4
[107] Defence Offset Facilitation Agency (DOFA), Retrieved 9 December 2009 from http://mod.nic.in/DOFA.htm
[108] For an official overview, see Indian Ministry of Defence, *Defence Production & Supply*, Retrieved 9 December 2009 from http://mod.nic.in/product&supp/welcome.html
[109] Indian Ministry of Defence, Directorate of Standardisation, *Department of Defence Production*, Retrieved 11 December 2009 from http://defstand.gov.in/search/images/Products/page_vi.doc

few areas and open up for exports in those areas, while importing defence matériel in other areas.

India still maintains, through the DPSUs, a comprehensive manufacturing capability in a broad range of defence matériel, but focused on production for the Indian Armed Forces. The quickest way to do this is licensed production, and that will not build a base for defence exports. While exports are not a goal in themselves, most industrialized countries have found it necessary to allow the export of defence matériel in order to support the home industry and its production for the national defence forces.

4.3.2 The Ordnance Factories

India has 40 ordnance factories (OFs).[110] They are under the jurisdiction of the Ordnance Factory Board (OFB). The OFB is mainly controlled by the Ministry of Defence in critical areas such as product development, R&D, and the formation of joint ventures, and in making commercial decisions. These restrictions have not meant that the OFB has not been able to graduate into an independent industrial enterprise. While the OFs provide a wide range of products, their portfolio is not enough to meet the requirements of the Armed Forces. Hence, the government is forced to resort to importing directly from other countries.[111]

The OFs are open to the idea of joint ventures with foreign firms in order to fulfil the offset clause in defence purchases above Rs 3 billion. In recent years, the OFB has raised its R&D budget to upgrade an array of guns, rockets, launchers, tanks and APCs.[112]

The ordnance factories are government units which constitute a major segment of India's defence industrial set-up, whose other constituent parts are the DPSUs, the DRDO and varied service-specific workshops and repair and maintenance establishments. The gross production of the OFs during the year 2005/2006 accounted for approximately 40 per cent of domestic supplies to the Armed Forces. In the year 2004/2005, they supplied 78 per cent of their output to the Army; the Ministry of Home Affairs came a distant second with a share of nearly 9 per cent; civil trade constituted 6 per cent; and the Navy and the Air Force had shares of 2 and 3 per cent, respectively.[113]

---

[110] Indian Ministry of Defence, Ordnance Factory Board, *Our Factories,* Retrieved 9 December 2009 from http://ofbindia.gov.in/index.php?wh=ourunits&lang=en. For a list of India's ordnance factories, see Appendix 6.

[111] Behera, *Revitalising the Ordnance Factories*

[112] R. K. J. Singh (ed.) *India Defence Yearbook 2009*, Dehra Dun, Natraj Publishers, 2009, p. 517

[113] N. Neihsial, *Private Sector Challenge to Ordnance Factories*, IDSA, 17 July 2008, Retrieved 24 November 2009 from

Apart from organizational structure, the ordnance factories have some inherent weaknesses to contend with: (1) dependence on the decisions of the government or the services for the type of technology to be imported; (2) exclusive dependence on the DRDO for induction of technology; (3) weak in-house R&D for enhancing innovations and incremental product improvements; and (4) a substantial mismatch between the created capacity of the organization and the changing demands of prime customers in terms of skill, manpower, technology and organizational location.[114]

4.4 The PSUs' Role vs. that of Private Companies

The Indian Government opened up its monopolistic state-owned defence industry in 2001 to private participation through licensing from the Department of Industrial Policy and Promotion (DIPP). The government also undertook to fund up to 80 per cent of private defence sector R&D cost.[115] Before 2001, the private sector's participation in the defence industry was restricted to the supply of raw materials, semi-finished products, parts and components to state-owned enterprises. By allowing private participation, the government hoped to reduce the increasing dependence on imports, facilitate technology transfer and meet the challenges posed by the digitization of military hardware.[116] It also allowed foreign direct investment (FDI) in private defence firms of up to 26 per cent of their capital. While the 26 per cent cap limits the leverage available for potential investors in Indian joint ventures, a few private firms have inked deals with global defence contractors. Tata Group has, for example, forged a number of partnerships with Boeing, EADS, IAI, Thales and others.[117] The PSUs, however, continue to dominate India's defence industry.[118] In March 2008, the Associated Chambers of Commerce and Industry of India (ASSOCHAM) suggested that the 26 per cent cap should be increased to 49 per cent.[119]

Since the opening up of defence production to the private sector in 2001, many Indian companies have come forward to engage in defence production. So far, they have been issued 80 letters of intent/industrial licences by the government to design, develop and manufacture warships, submarines, electronic warfare

---

http://www.idsa.in/idsastrategiccomments/PrivateSectorChallengetoOrdnanceFactories_NNeihsia1_170708

[114] Ibid.

[115] N. Gupta, 2009

[116] R. Bedi, "India's defence industry open to private investors", *Jane's Defence Weekly*, 5 May 2001

[117] Behera, *Tata's Forays into Defence Production*

[118] Bedi, "India's defence industry open to private investors"

[119] ASSOCHAM, *Open Up Defence Sector By 49% For FDI's : ASSOCHAM*, 2 March 2008

systems, and combat vehicles, among others. Many of these companies have also forged various partnerships with global defence firms for providing high-end manufacturing and technology solutions.[120]

The role of the private sector in India's defence industry should not be underestimated. The DPSUs outsource to the extent of more than 30 per cent, and about 80 per cent of production in the ordnance factories is outsourced. Private players have the potential to contribute much more to meet the country's defence requirements and help achieve the stated goal of self-reliance.[121]

However, it can be argued that the capabilities of the private sector, in terms of financial, technological and managerial efficiency, have not so far been fully exploited. Private firms have, until recently, been debarred from direct production of defence items. Though the MoD now allows private enterprises to participate in defence production, a significant barrier still persists. The private sector has not had access to formal information about the equipment needs of the Armed Forces, is discriminated against in comparison with the established public sector production enterprises, and is not trusted to undertake any major assignments within development or production. Consequently, so far no private companies have been able to contribute with any major breakthrough in complete systems integration.[122]

New Delhi has previously shortlisted a dozen private firms to be accorded special defence industry status, so-called Raksha Udyog Ratna (RUR), on the basis of turnover and past performance. RUR status would allow these companies to be treated on a par with PSUs. It would also allow them to access foreign technologies, enter into collaboration with overseas players for the manufacture of military hardware, and avail themselves of up to 26 per cent FDI. Moreover, it would enable them to get substantial government financial investment (up to 80 per cent) for the design, development and manufacture of defence products, including fighter aircraft, tanks and warships. However, because of resistance by a number of trade unions and left-wing political parties, no formal notification has been issued.[123]

The RUR proposal, which was designed to promote competition between private and state-owned firms, was tabled in 2007. Instead, India's Defence Procurement Procedure of 2009 (DPP 2009) opened the way for so-called requests for proposals (RfPs) to be issued to selected private Indian firms. According to the

[120] Behera, *India's Defence Offset Policy*, Strategic Analysis 33:2, London: Routledge, 2009
[121] N. Gupta, 2009
[122] L. K. Behera, *Economic Downturn: Options for MoD*, Institute for Defence Studies and Analyses, May 6, 2009, Retrieved 14 December 2009 from http://www.idsa.in/idsastrategiccomments/economicdownturnoptionsforMoD_lkbehera_260509
[123] R. Sharma, "Defence Ministry may notify companies cleared for Raksha Udyog Ratna status", *The Hindu*, 8 August 2009, Retrieved 14 December 2009 from http://www.thehindu.com/2008/08/08/stories/2008080856691400.htm

previous DPP, RfPs could only be dispatched to foreign companies.[124] Defence Minister A. K. Antony has stated that the DPP 2009 is part of a bid to promote the Indian defence industry and bring transparency in acquisitions.[125]

The private sector played a significant role in the defence sector even before 2001. Private companies have supplied the defence PSUs and ordnance factories with raw materials and components.[126] However, the private companies cannot obtain formal information about the equipment needs of the Armed Forces, face discrimination, as the government favours the public sector enterprises, and are not trusted to undertake any major assignments for development and production. Calls have been made by Indian scholars for the government to exploit the financial, technological and managerial capabilities of the private sector more effectively.[127]

The candidates are Tata Motors, Larsen and Toubro, Tata Power Company, Mahindra and Mahindra, Ashok Leyland, Tata Advanced Materials, Kirloskar, HCL, Godrej & Boyce, Bharat Forge, Infosys Technologies, Wipro Technologies and Tata Consultancy Services.[128]

4.5 India's Defence Procurement

India's defence procurement organization is divided into four parts:[129]

- The Defence Acquisition Council (DAC), which oversees the entire acquisition process of India's Armed Forces. The DAC was constituted in 2001 and is headed by the minister of defence.
- The Defence Procurement Board (DPB), which overseas all activities related to procurement.
- The Defence Production Board, which oversees domestic manufacturing.
- The Defence R&D Board, which monitors and reports on indigenous R&D proposals.

[124] J. Grevatt, "India's new procurement policy falls short of expectations", *Jane's Defence Weekly*, 30 October 2009
[125] Press Trust of India, "New Defence Procurement Policy on November 1", 27 October 2009, Retrieved 14 December 2009 from http://www.business-standard.com/india/news/new-defence-procurement-policynov-1/00/48/76849/on
[126] Confederation of Indian Industry, *Defence Procurement Organisation*, Retrieved 9 December 2009 from http://www.ciidefence.com/defence_proc_org.asp?id=3
[127] Behera, *Economic Downturn: Options for MoD*
[128] R. Sharma, "Defence Ministry may notify companies cleared for Raksha Udyog Ratna status", *The Hindu*, 8 August 2009
[129] Confederation of Indian Industry, *Defence Procurement Organisation*, Retrieved 9 December 2009 from http://www.ciidefence.com/defence_proc_org.asp?id=3

On top of the above four, the Acquisition Wing of the Ministry of Defence functions as a procurement agency for the MoD.

In the last five years, the share of domestic procurement in India's capital acquisition has more than doubled, from 40 per cent in 2002/2003 to nearly 80 per cent in 2006/2007. HAL, the biggest DPSU and the largest licensed producer of major advanced platforms, has achieved 70–75 per cent indigenous content in its sales and 80–85 per cent in repair and overhaul services of the major systems. Similarly, BEL, the second-biggest DPSU, has registered impressive indigenization, of over 60 per cent for many of its major projects.[130]

India's private defence sector received about 9 per cent of the country's total $8.5 billion procurement budget in 2009/10.[131] Approximately 21 per cent of the budget is spent on procuring capabilities from the eight DPSUs. The remaining 70 per cent is awarded to overseas vendors.[132] Israel replaced France in 2007 as India's second-largest arms supplier after Russia, and may since have surpassed Russia in terms of arms sales to India.[133] According to some estimates, Israel broke the $1 billion mark in new contracts signed annually in 2007 and 2008, compared to Russia's annual average of $875 million for the past 40 years.[134]

The Indian Government intends eventually to source 70 per cent of its defence equipment from Indian industries, state-owned and private. This would open up a potential $45 billion defence market for local firms over the next five years.[135] The goal of 70 per cent domestic sourcing was already set in a 1995 policy statement, according to which it should have been reached in 2005.[136] New Delhi has since stated that the target of self-reliance in defence systems should be reached by 2020.[137] Defence Minister A. K. Antony in early 2009 expressed his unhappiness over the painfully slow pace of the development of indigenous technologies for developing hardware and fighting machines required by the

---

[130] Behera, *India's Defence Offset Policy*, p. 245

[131] *The Hindu*, "New defence procurement policy to go on stream from Sunday', 30 October 2009; J. Grevatt, "India's private defence sector will not be affected by economic downturn, says industry body", *Jane's Defence Industry*, 21 April 2009

[132] Grevatt, "India's private defence sector…"

[133] AFP, *South Asia's Biggest Airshow Ends in India*, 15 February 2009, Retrieved 14 December 2009 from http://www.google.com/hostednews/afp/article/ALeqM5gJorTfRRvGoVCoEX0mOdlrL6H9Ww

[134] Y. Katz, "Israel now India's top defence supplier", *Jerusalem Post*, 15 February 2009, Retrieved 14 December 2009 from http://www.jpost.com/servlet/Satellite?cid=1233304779410&pagename=JPArticle/ShowFull

[135] B. Majumdar, "India says to buy 70 pct defence equipment locally", Reuters, 20 August 2009, Retrieved 14 December 2009 from http://in.reuters.com/article/topNews/idINIndia-41865220090820

[136] J. M. Conley, *Indo-Russian Military and Nuclear Cooperation: Lessons and Options for U.S. Policy in South Asia*, Maryland, Lexington Books, 2001, pp. 65-66

[137] *The Hindu*, "Set goal for self-reliance in defence systems: Kalam", 22 February 2007, Retrieved 9 December 2009 from http://www.thehindu.com/2007/02/22/stories/2007022216841300.htm

Indian defence forces. “We are still far behind as far as Jawaharlal Nehru’s dream on achieving self-reliance in the defence sector is concerned. Despite being the fourth largest scientific community in the world, only 30 percent of our defence products are indigenous”, he said.[138]

India’s security spending may rise to as much as $10 billion in the next seven years, according to the country’s minister of state for defence.[139] India’s cumulative defence purchases are expected to double to more than $30 billion by 2012 and climb further to $80 billion by the end of its 13th Five-Year Defence Finance Plan to 2022.[140] Defence Minister Antony has said that the total budgetary provision for capital acquisition is likely to reach $50 billion over the next five to six years. Defence and company officials project that it will touch the $100 billion mark in ten years.[141] India wants to build 100 warships over the next ten years and to develop battle tanks, artillery and low-cost shipbuilding capabilities.[142]

Among the three services, the Air Force is the most capital-intensive, accounting for nearly 40 per cent of total capital expenditure in the defence area in 2008/2009, followed by the Army (28 per cent) and the Navy (25 per cent).[143]

India’s latest Defence Procurement Procedure (the DPP 2009),[144] published on 1 November 2009, encouraged leading domestic firms to bid for more production contracts and to establish joint ventures with foreign companies.

Previous versions of the DPP have included three categories of procurement, while a fourth was added in 2009.[145] The three procurement categories are (1) “buy”, meaning direct imports; (2) “make”, under which Indian R&D efforts translate into domestic manufacturing of hi-tech weapons systems; and (3) “buy and make”, under which some contracted products are imported and some of the products are manufactured within India. Under the “buy and make” category, foreign companies agree to transfer certain technologies to the Indian defence industry. This means that India does not have to take on expensive and time-consuming R&D. It also promotes indigenous manufacturing and partnerships with international companies.

---

[138] *New Indian Express*, “Pace of indigenisation very slow: Antony”, 9 February 2009, Retrieved 14 December 2009

[139] M. Bell, “Indian defence minister calls for support from private industry”, *Jane’s Defence Industry*, 20 August 2009

[140] R. Bedi, “India keeps shooting itself in the foot”, *Jane’s Defence Weekly*, 14 October 2009

[141] B. Majumdar, “India says to buy 70 pct defence equipment locally”

[142] Ibid.

[143] L. K. Behera, *India’s Defence Spending: A Trend Analysis*, IDSA, Retrieved 12 November 2009 from the author

[144] Ministry of Defence, *Defence Procurement Procedure – 2008 (Amendment – 2009)*, Retrieved 9 December 2009 from http://mod.nic.in/dpm/DPP-2008/DPP2008-AMENDMENT.pdf

[145] L. K. Behera, *Indian Defence Industry Poised to Grow*, IDSA, 10 November 2009

However, due to the greater involvement of the Ministry of Defence in negotiating terms for technology transfer, the "buy and make" concept proved to be less successful than the government had hoped. It had not fully encouraged the formation of joint ventures or alliances for co-production between Indian and overseas companies. Neither did it contribute to improving the technical capabilities of Indian firms as no RfPs were issued to domestic businesses.[146] In the revised DPP of 2009, a new category – "buy and make (Indian)" – was introduced. This amendment will lead to RfPs also being issued to Indian companies that have the capabilities required, which will receive supply orders and be able to negotiate technology transfer terms with foreign firms. Foreign companies will be compelled to set up joint ventures with Indian firms, because they will only be able to sell their products through these jointly-owned companies. At least 50 per cent of the value of the products supplied by these domestic firms must be of Indian origin. While the "buy and make (Indian)" category is expected to be beneficial for the private sector, its impact on domestic defence production will not be obvious for another couple of years.[147]

The 2009 revision of the DPP also states that the government will "widely publicize" a public version of the Long Term Perspective Plan. The plan will provide a 15-year technology perspective and a capability road map of the defence forces, which will make it possible for the Indian companies to plan in advance in their requisite areas of strength. This is particularly good news for the private firms.

In spite of the improvements in the latest DPP, however, many issues remain to be resolved in order to boost growth in India's defence industry. First, the advantages enjoyed by the public sector over its private-sector counterparts remain. Second, while there is an apparent interest on the part of foreign firms in entering into Indian joint ventures, the bureaucracy linked to the approval of such accords continues to create frustration.[148] Moreover, FDI in strategic ventures is still not allowed to surpass 26 per cent.

In the coming years, the DPP will be updated annually rather than biennially. *Jane's Defence Weekly* expects the DPP 2010 to include more guidance on the government's attitude towards the cap on FDI; an increase in permissible offset banking from two and a half years to five years; and a statement on the technology which India hopes to attract in order to meet its aspirations for self-sufficiency. Furthermore, gradual measures are expected to erode the gap

---

[146] N. Gupta, *Will Indian Defence Private Sector Deliver with Recent Policy Changes?* IDSA, 24 November 2009, Retrieved 27 November 2009 from http://www.idsa.in/idsacomments/WillIndianDefencePrivateSectorDeliverwithRecentPolicyChanges_ngupta_241109

[147] Ibid.

[148] J. Grevatt, "Indian procurement policy update could provide 'tremendous opportunity'", *Jane's Defence Weekly*, 11 November 2009

between private and public sector undertakings.[149]

Table 1: Major Indian arms orders (2004–2008) awaiting delivery or completion of delivery[150]

Equipment	Service	Supplier	Quantity	Cost (billion US$)	Year of order
T-90 main battle tank	Army	Russia	347	1.2	2007
Scorpene submarine	Navy	France	6	3.5	2005
Vikramaditya aircraft carrier	Navy	Russia	1	2.7–3.0	2004
P-8i surveillance aircraft	Navy	US	8	2.1	2008
Advanced Talwar frigates	Navy	Russia	3	1.5	2006
Su-30 MKI combat aircraft	Air Force	Russia	40	1.6	2007
Hawk advanced jet trainer aircraft	Air Force	UK	66	1.45	2004
Mi-17 medium-lift helicopter	Air Force	Russia	80	1.0	2008

In August 2007 the Indian Government issued an RfP to six global vendors for the medium-range multi-role combat aircraft (MMRCA).[151] The MMRCA is the most important of the Indian Air Force's 26 equipment programmes out to tender. The Indian specification is for 126 fourth-generation fighter jets, costing nearly $12 billion. The first 18 aircraft will be delivered before 2012 but the 108 others will be built in India by HAL. At the same time, the chosen supplier will have to reinvest half of the contract's value, at least $6 billion, in the Indian company.[152]

It is important to note that vast sums under the capital expenditure budget remain unspent by the Indian Government. From fiscal year 2000/2001 up to and

[149] Ibid.
[150] IISS, "India arms for the future", *Strategic Comments*, vol. 15, issue 1, February 2009, cited in L. K. Behera, *India's Defence Spending: A Trend Analysis*, IDSA, Retrieved on 12 November 2009 from the author
[151] L. K. Behera, *India's Defence Offset Policy*, Strategic Analysis 33:2, 2009, London: Routledge
[152] Zajec, Olivier, "China becomes adversary number one; India: a giant in full flight", *Le Monde Diplomatique*, 1 September 2009

including 2007/2008, the underutilization of the capital budget was at times as high as 31 per cent of total budgeted capital expenditure. This is partly related to the lack of an integrated approach for acquisitions.[153] Tenders were issued, withdrawn and then reissued, contributing to overall delays that resulted in operational shortcomings. In fiscal year 2007/2008, about $878 million earmarked for military purchases, upgrades and modernization were returned unspent to the federal fund.[154] While capital expenditure has been increased substantially over the years, underutilization of resources has increased each year. In terms of percentage of the budget, it increased from 4 per cent to 15 per cent between 2004/2005 and 2008/2009. [155]

4.6 The Offset Policy

Offsets are "compensation" demanded by the buyers from sellers in return for outflow of resources to the latter. Offsets are the practice by which the award of contracts by foreign governments or companies is exchanged for commitments to provide industrial compensation. Defence offsets are intended to promote the capability of the Indian defence industry. These offsets include mandatory co-production, technology transfer, investment in the defence industry, and licensed production.[156]

India's offset policy goes back to the 1960s, when the country made a collective effort in the wake of the 1962 war with China to build a domestic defence industry through foreign assistance. The DPP 2005 for the first time set out the official offset policy, stipulating that all contracts worth Rs 3 billion or above would incorporate defence-specific offsets amounting to 30 per cent. According to the DPP 2005, the offset obligations of foreign companies should be discharged concurrently with the main contract.[157] The MoD expects the offset business to bring in about $10 billion in the 11th Five-Year Plan (2007–2012) as between 30 and 50 per cent of the value of defence deals is required to be reinvested in India's defence industry. The government has ruled out allowing multinational arms contractors to go in for indirect offsets in defence deals, i.e.

[153] L. K. Behera, *Economic Downturn: Options for MoD*, Institute for Defence Studies and Analyses, 6 May 2009
[154] R. Bedi, "India keeps shooting itself in the foot"
[155] L. K. Behera, *India's Defence Budget 2009/10: An Assessment*, IDSA, 18 February 2009, Retrieved 9 December 2009 from http://www.idsa.in/idsastrategiccomments/IndiasDefenceBudget2009-10_LKBehera_180209
[156] N. Gupta, *Will Indian Defence Private Sector Deliver with Recent Policy Changes?* IDSA, 24 November 2009, Retrieved 27 November 2009 from http://www.idsa.in/idsacomments/WillIndianDefencePrivateSectorDeliverwithRecentPolicyChanges_ngupta_241109
[157] L. K. Behera, *India's Defence Offset Policy*, Strategic Analysis 33:2, 2009, London: Routledge, p. 243

investments in non-defence sectors.[158] Under the offset policy, foreign firms can choose Indian companies as their partners. However, a foreign vendor's freedom in choosing an Indian partner is restricted to those companies that have already received licences or are most likely to obtain one.[159]

The dismal performance of the policy in 2005 led the MoD to issue a revised set of guidelines under the DPP 2006. This version of the DPP made offsets compulsory in arms contracts; enlarged the scope of offset obligations by allowing foreign companies to form joint ventures in India and invest in Indian defence R&D organizations; and created a dedicated agency to facilitate offsets between Indian industry and its foreign counterparts. However, both domestic and foreign companies demanded added provisions, such as the banking of offsets and transfer of technology, to be included in the offset policy. The private sector also demanded greater clarity about existing industrial licensing requirements.[160]

The inclusion of an "Option Clause" in the offset policy would henceforward allow foreign vendors to change their offset partners – though not the offset component and value – midway through the contractual period in "exceptional cases". Such cases would, however, be most likely to arise when an Indian partner defaults on its contractual promises. The clause would ensure that a company could not take its position for granted once it is selected as an offset partner. The fear of being replaced by another company in the event of failure to meet its obligations under a contract would not only put a question mark over its credibility, but would motivate it to improve its competitiveness in order to avoid eventual embarrassment.[161]

[158] Ibid., p. 244; S. Srivastava, "India's military eyes private options", *Asia Times*, 10 August 2007, Retrieved 28 October 2009 from http://www.atimes.com/atimes/South_Asia/IH10Df02.html
[159] L. K. Behera, *India's Defence Offset Policy*
[160] Ibid
[161] L. K. Behera, *Indian Defence Industry Poised to Grow*, IDSA, 10 November 12009

5 Final Remarks

India is the world's largest democracy. The results of the elections in 2009 gave the Congress Party a surprising victory. Manmohan Singh will lead India during the next five years as the prime minister.[162] India will have to tackle many challenges during the coming years. As one of the most important figures and architects behind India's economic transformation in the early 1990s, Prime Minister Singh will be free to push ahead with more political and economic reforms. Under the previous administration, the Congress Party was dependent on the Communist Party to govern India.[163] The unexpected victory in the last election means that the INC does not have to depend on the support of the Communists to run the government.

Apart from dealing with its powerful neighbour (China) in the north, and an unstable political situation in neighbouring Pakistan, New Delhi will also have many domestic challenges to tackle. First of all, there are still more than 400 million Indians who suffer from poverty. The poverty reduction programme has worked out reasonably well, but there is still room for improvement. Poverty reduction is also regarded as a pre-emptive and long-term action in the fight against internal conflicts and terrorist activities, especially in the poor regions.

One of the central challenges to the central government is to speed up its investment in infrastructure. Despite the government's huge investment in roads and highways, India still has considerable problems regarding its infrastructure, both in the countryside and within/around the big cities.[164]

Investment in infrastructure has many benefits. First of all, it facilitates the transport of agricultural products to the market. Making it easier for the farmers to sell their products means greater efficiency in the agriculture sector and the lifting of more people out of poverty. Second, improved roads and highways will improve India's comparative advantages in manufacturing. This is an area where India has traditionally been weak compared to China and other Asian countries. However, during the last two years, the Indian manufacturing sector has outperformed the service sector in terms of rate of growth.[165] Further investment in physical infrastructure would enhance the growing manufacturing sector and help India to become a global player in the future.

[162] BBC, "Congress hails India poll victory", Retrieved 19 November 2009 from http://news.bbc.co.uk/2/hi/south_asia/8051633.stm
[163] Interview with Robin Sukhia, head of the Sweden India Business Council, Stockholm, 24 November 2009
[164] Interview with Sukhia
[165] Telephone interview with Ulrika Bohman and Ajay Sachdeva, Swedish Trade, 17 November 2009

In the service sector, India already has a global reputation as a success story. As mentioned in chapter 2, it is home to many global players in the service industry, especially IT, software and consultancy. In order to maintain and even enhance its position in these fields, India has to continue to invest in research and development, education and infrastructure. Further economic reforms are needed to make India an attractive place for foreign direct investment. India also needs a stringent monetary policy in order to keep inflation under control.

High inflation would undermine the country's competitive advantages in the service sector. Already, there are signs that India has started losing its competitive advantage in wages, and employers will increasingly look to even lower-cost countries for their operations. Wages have increased rapidly in recent years and are expected to rise further in the coming years.[166] This has resulted in a tight labour market.[167]

A combination of a tight labour market and high wage increases will lead to loss of competitive advantage.[168] Other challenges for India are that the country is quite bureaucratic, suffers from widespread corruption, has rigid labour laws, and is unable to build infrastructure fast enough.[169] If these problems are not addressed in proper manner and proper time, there are risks that India will suffer from the "brain drain" phenomenon. India has earlier experienced tremendous pressure from the immigrant IT workers fleeing to the USA and other countries for better salaries and a better quality of life.

[166] For 2008 the increase was about 15 per cent on average, which was almost three times the rate of inflation.
[167] ExpressIndia, *Is India Losing Its Competitive Advantages?* 15 December 2007, Retrieved 30 November 2009 from http://www.expressindia.com/latest-news/Is-India-losing-its-competitive-advantage/250672/
[168] Ibid.
[169] *A New World Economy*, Business Week, 22 August 2008, Retrieved 12 November 2009 from http://www.businessweek.com/magazine/content/05_34/b3948401.htm

6 List of References

Books and monographs

Annual report 2008-2009, Ministry of Defence, Government of India, New Delhi, 2008

Bergstrand, B.-G., *A Few Comments on the Relationship between Economic Growth and Military Expenditures in Some Selected Countries*, Stockholm, Swedish Defence Research Agency, 1 October 2009, pp. 1-2

Cohen, S. P. et al., *Four Crises and a Peace Process: American Engagement in South Asia*, Washington, D.C., Brookings Institution Press, 2007

Cohen, S. P., India: *Emerging Power*, Washington, D.C., Brookings Institutions Press, 2001, pp. 100-105

Cohen, S. P. et al., "India and Pakistan: 'If you don't know where you are going, any road will take you there'", in K. Zetterlund (ed.), *Pakistan – Consequences of Deteriorating Security in Afghanistan*, Stockholm, Swedish Defence Research Agency, 2009, pp. 131-141

Conley, J. M., *Indo-Russian Military and Nuclear Cooperation: Lessons and Options for U.S. Policy in South Asia*, Maryland, Lexington Books, 2001

Drekmeier, C., *Kingship and Community in Early India*, Stanford, Stanford University Press, 1962, pp. 69-80

Ghose, S., *Jawaharlal Nehru, a Biography*, Bombay, Allied Publishers Ltd, 1993

Heickerö, R., *Cyber Antagonism between Hacker Groups Develops New Challenges*, Swedish Defence Research Agency, 22 October 2009

Holme, I. M., Solvang, B. K., *Forskningsmetodik – om kvalitativa och kvantitativa metoder*, Lund, Studentlitteratur, 1997, pp. 75-86

International Institute for Strategic Studies (IISS), *The Military Balance 2009*, London, IISS, 2009

Kiesow, I., Norling, N., *The Rise of India: Problems and Opportunities*, Stockholm, Silk Road Studies Program, 2007, pp. 23-25

Luce, E., *In Spite of the Gods*, London, Abacus, 2007, pp. 37-39

Ministry of Defence, *Annual Report 2008/2009*, Government of India, New Delhi, 2008

Pant, H. V., *India Negotiates its Rise in the International System*, New York, Palgrave Macmillan, 2008

Planning Commission, *11th Five Year Plan 2007–2012*, Chapter 12, Development of infrastructure. Retrieved 17 November from http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v1/11v1_ch12.pdf

Porter, M. E., *The Competitive Advantage of Nations*, New York, Palgrave, 1998, pp. 73-83

Singh, R. K. J., *India Defence Yearbook 2009*, Natraj Publishers, Dehra Dun, 2009

Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook 2009*, Oxford, Oxford University Press, 2009

The Military Balance 2009, London, IISS, 2009

The International Institute for Strategic Studies, The Military Balance 2009, Central and South Asia, pp. 333-350

Thomas, R., *India's Emergence as an Industrial Power*, Royal Institute of International Affairs, London, C. Hurst & Company, 1982, pp. 3-6

Newspapers and journals

"A new world economy", *Business Week*, 22 August 2008, Retrieved 12 November 2009 from http://www.businessweek.com/magazine/content/05_34/b3948401.htm

Astill, J., "An elephant, not a tiger", *The Economist*, 13–19 December 2008, pp. 3-15

National Air and Space Intelligence Center, Wright-Patterson Air Force Base, *Ballistic and Cruise Missile Threat*, *NASIC-1031-0985-09*, April 2009, Retrieved 14 December 2009 from http://www.fas.org/programs/ssp/nukes/NASIC2009.pdf

ExpressIndia, *Is India Losing Its Competitive Advantages?* 15 December 2007, Retrieved 23 October 2009 from http://www.expressindia.com/latest-news/Is-India-losing-its-competitive-advantage/250672/

Ribeiro, J., "India's software, services exports forecast at $40B", *InfoWorld*, 2 July 2007, Retrieved 23 October 2009 from http://www.infoworld.com/t/business/india%E2%80%99s-software-services-exports-forecast-40b-015

Jessie, P., "Indian IT firms growing faster than their global peers", *The Economic Times*, Retrieved 11 November 2009 from http://economictimes.indiatimes.com/Indian-IT-firms-growing-faster-than-their-global-peers/articleshow/5213729.cms

Norris, R. S., Kristensen, H. M., "Nuclear notebook: India's nuclear forces, 2008", *Bulletin of the Atomic Scientists*, vol. 64, no. 5, November/December 2008

Norris, R. S., Kristensen, H. M., "Nuclear notebook: worldwide deployments of nuclear weapons, 2009", *Bulletin of the Atomic Scientists*, vol. 65, no. 6, November/December 2009

"Pokhran II not fully successful", *Times of India*, 27 August 2009

Prakash, A., "India's higher defence organisation: implications for national security and jointness", *Journal of Defence Studies*, vol. 1, issue 1, 2007

Ramachandran, S., "Turkey offers oil pipe lifeline to India", *Asia Times*, Retrieved 17 November 2009 from http://www.atimes.com/atimes/South_Asia/JB27Df03.html

Rethinaraj, T. S. G., "Bang or whimper? – Reconsidering India's nuclear capabilities", *Jane's Intelligence Review*, 12 November 2009

The Economist, "Terror in India", 29 November–5 December 2008

The Economic Times, "Investing in India is a real competitive advantage", 15 April 2004, Retrieved 16 October 2009 from http://www.ibef.org/artdisplay.aspx?cat_id=105&art_id=2013

Internet sources

AFP, *South Asia's Biggest Airshow Ends in India*, 15 February 2009, Retrieved 14 December 2009 from http://www.google.com/hostednews/afp/article/ALeqM5gJorTfRRvGoVCoEX0mOdlrL6H9Ww

AsianInfo, *India's Politics*, Retrieved 29 November 2009 from http://www.asianinfo.org/asianinfo/india/politics.htm

ASSOCHAM, *Open Up Defence Sector By 49% For FDIs : ASSOCHAM*, 2 March 2008

BBC, *Country Profile: India.* Retrieved 19 November 2009 from http://news.bbc.co.uk/2/hi/south_asia/country_profiles/1154019.stm

BBC, *Congress Hails India Poll Victory*, Retrieved 29 November 2009 from http://news.bbc.co.uk/2/hi/south_asia/8051633.stm

BDL corporate website: http://bdl.ap.nic.in

Bedi, R., "India's defence industry open to private investors", *Jane's Defence Weekly*, 25 May 2001

Bedi, R., "India keeps shooting itself in the foot", *Jane's Defence Weekly*, 14 October 2009

Behera, L. K., *Economic Downturn: Options for MoD*, Institute for Defence Studies and Analyses (IDSA), 6 May 2009, Retrieved 14 December 2009 from http://www.idsa.in/idsastrategiccomments/economicdownturnoptionsforMoD_lkbehera_260509

Behera, L. K., *Indian Defence Industry Poised to Grow*, IDSA, 10 November 2009

Behera, L. K., *India's Defence Budget 2009/10: An Assessment*, IDSA, 18 February 2009, Retrieved 9 December 2009 from http://www.idsa.in/idsastrategiccomments/IndiasDefenceBudget2009-10_LKBehera_180209

Behera, L. K., *India's Defence Spending: A Trend Analysis*, IDSA, Retrieved 12 November 2009

Behera, L. K, *Revitalising the Ordnance Factories*, IDSA, 28 August 2009, Retrieved 9 December 2009 from http://www.idsa.in/event/RevitalisingtheOrdnanceFactories_lkbehera_090828

Behera, L. K., *Tata's Forays into Defence Production*, Institute for Defence Studies and Analyses, 17 June 2008

Behera, L. K., *India's Defence Offset Policy*, Strategic Analysis 33:2, London, Routledge, 2009

BEL, *Annual Report 2008-09*, Retrieved 3 December 2009 from http://www.bel-india.com/images/itm-pdfs/AR_2008-09.pdf

BEL corporate website: http://www.bel-india.com

Bell, Matthew, "Indian defence minister calls for support from private industry", *Jane's Defence Industry*, 20 August 2009

BEML corporate website: http://www.bemlindia.com

BP*, Statistical Review of World Energy 2009*, Retrieved 19 November 2009 from http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622

BrahMos Aerospace, *Indian Industries*, Retrieved 9 December 2009 from http://www.brahmos.com/content.php?id=12&sid=12

Centre for Land Warfare Studies, *CAPS-NMF-CLAWS-CENJOWS-IDSA Guest Lecture on National Security*, 6 August 2009, Retrieved 24 November 2009 from http://www.claws.in/index.php?action=master&task=376&u_id=36

Civil Service India, *India Administrative Service*, Retrieved 29 November 2009 from www.civilserviceindia.com/Indian-Administrative-Service.html

Civil Service India, *India Foreign Service*, Retrieved 29 November 2009 from http://www.civilserviceindia.com/India-Foreign-Service.html

Confederation of Indian Industry, *Defence Procurement Organisation*, Retrieved 9 December 2009 from http://www.ciidefence.com/defence_proc_org.asp?id=3

Defence Offset Facilitation Agency (DOFA), URL: http://mod.nic.in/DOFA.htm

Defence Research and Development Organisation website, Retrieved 23 November 2009 from http://www.drdo.org/

Economy Watch, *Top World Economies*. Retrieved 11 November 2009 from http://www.economywatch.com/economies-in-top/

Embassy of India, Washington, D.C., *Draft Report of National Security Advisory Board on Indian Nuclear Doctrine*, 1999, Retrieved 20 November 2009 from http://www.indianembassy.org/policy/CTBT/nuclear_doctrine_aug_17_1999.html

Embassy of India, Washington, D.C., *Political Structure*, Retrieved 10 December 2009 from http://www.indianembassy.org/dydemo/political.htm

Foreign Policy, *The Think Tank Index*, Retrieved 23 November 2009 from http://www.foreignpolicy.com/story/cms.php?story_id=4598&page=3

Government of India, *Indian Economy, Economic Indicators from 1991*, Retrieved 25 November 2009 from http://business.gov.in/indian_economy/eco_indicators.php

Grevatt, J., "UK industry officials visit India to increase defence trade", *Jane's Defence Industry*, 15 September 2009

Grevatt, J., "India's new procurement policy falls short of expectations", *Jane's Defence Weekly*, 30 October 2009

Grevatt, J., "India's private defence sector will not be affected by economic downturn, says industry body", *Jane's Defence Industry*, 21 April 2009

GRSE corporate website: http://www.grse.nic.in/indnew.htm

GSL corporate website: http://www.goashipyard.co.in

Gupta, N., *Will Indian Defence Private Sector Deliver with Recent Policy Changes?*, IDSA, 24 November 2009, Retrieved 27 November 2009 from http://www.idsa.in/idsacomments/WillIndianDefencePrivateSectorDeliverwithRecentPolicyChanges_ngupta_241109

HAL corporate website: http://www.hal-india.com

IBEF, *Investing in India… Is a Real Competitive Advantage*, Retrieved 5 November 2009 from http://www.ibef.org/artdisplay.aspx?cat_id=105&art_id=2013

IDSA website, *About Us*, Retrieved 24 November 2009 from http://www.idsa.in/aboutidsa

IDSA, *IDSA Ranked Third among Top 25 Think Tanks in Asia*, Retrieved 24 November 2009 from http://www.idsa.in/IDSA-Ranking_2008

Indian Ministry of Defence, *Standing Committee on Defence (2006-07) Fourteenth Lok Sabha, "Defence Research and Development Organisation (DRDO)"*, March 2007, Retrieved 24 November 2009 from http://164.100.24.208/ls/CommitteeR/Defence/14threport.pdf

Indian Ministry of Defence, Department of Defence Production, Retrieved 28 October 2009 from http://mod.nic.in/product&supp/welcome.html

Indian Ministry of Defence, Department of Defence Production, *About the Ministry*, Retrieved 3 November 2009 from http://mod.nic.in/aboutus/body.htm#as4

Indian Ministry of Defence, Ordnance Factory Board, Retrieved 28 October 2009 from http://ofbindia.gov.in/index.php?wh=ourunits&lang=en

Indian Ministry of Defence, Directorate of Standardisation, *Department of Defence Production*, Retrieved 11 December 2009 from http://defstand.gov.in/search/images/Products/page_vi.doc

International Energy Agency, *World Energy Outlook 2009*. Retrieved 19 November 2009 from http://www.worldenergyoutlook.org/docs/weo2009/WEO2009_es_english.pdf

Intute, *Delhi Policy Group*, Retrieved 24 November 2009 from http://www.intute.ac.uk/cgi-bin/fullrecord.pl?handle=sosig1009982494-17616

Katz, Y., "Israel now India's top defence supplier", *Jerusalem Post*, 15 February 2009

Kundu, A., *India's National Security under the BJP/NDA: "Strong at Home, Engaged Abroad"*, Brussels, European Institute for Asian Studies, June 2004, Retrieved 9 November 2009 from http://www.eias.org/publications/briefing/2004/kunduindia2.pdf

L&T, *L&T Makes Key Contribution to India's First Nuclear Powered Submarine*, 26 July 2009, Retrieved 9 December 2009 from http://www.larsentoubro.com/lntcorporate/LnT_PRS/PDF/L&TPressRelease-Jul26-2009.pdf

Lok Sabha, *Status of Implementation of Unified Command for Armed Forces Thirty Sixth Report*, New Delhi, Standing Committee on Defence, Ministry of Defence, 2009, p. 3, Retrieved 7 November 2009 from http://164.100.47.132/committeereports/Defence/36th%20Report-UNIFIED%20COMMAND.pdf

Majumdar, B., "India Mahindra arm to bid for $3.5 bln defence deals", Reuters, 24 November 2009

Majumdar, B., "India says to buy 70 pct defence equipment locally", Reuters, 20 August 2009, Retrieved 14 December 2009 from http://in.reuters.com/article/topNews/idINIndia-41865220090820

Manas, *Independent India*, Retrieved 12 November 2009 from http://www.sscnet.ucla.edu/southasia/History/Independent/indep.html

MDL corporate website: www.mdlindia.com

MIDHANI corporate website: http://www.midhani.com

Ministry of Defence, *Defence Procurement Procedure – 2008 (Amendment – 2009)*, Retrieved 9 December 2009 from http://mod.nic.in/dpm/DPP-2008/DPP2008-AMENDMENT.pdf

Ministry of Defence, Government of India, *About the Ministry*, Retrieved 1 November 2009 from http://mod.nic.in/aboutus/body.htm

Ministry of External Affairs, Government of India, "The Cabinet Committee on Security reviews operationalization of India's nuclear doctrine", Press release, 4 January 2003, Retrieved 17 November 2009 from http://www.meaindia.nic.in

NASSCOM (National Association of Software and Services Companies), Retrieved 23 November 2009 from http://www.nasscom.org/Nasscom/templates/NormalPage.aspx?id=55739

Neihsial, N., *Is India on the Path to Vibrant Defence Industry?* Institute for Defence Studies and Analyses, 8 October 2008

Neihsial, N., *Private Sector Challenge to Ordnance Factories*, IDSA, 17 July 2008, Retrieved 24 November 2009 from http://www.idsa.in/idsastrategiccomments/PrivateSectorChallengetoOrdnanceFactories_NNeihsial_170708

Neihsial, N., *What is Wrong with India's Defence Industrial Policy?*, IDSA, 22 August 2008, Retrieved 24 November 2009 from http://www.idsa.in/idsastrategiccomments/WhatiswrongwithIndiasDefenceIndustrialPolicy_NNeihsial_220808

New Indian Express, "Pace of indigenisation very slow: Antony", 9 February 2009

Oberoi, V., "Need for holistic restructuring of the Indian military", *Journal of Defence Studies*, vol. 2, issue 1, 2008, Retrieved 9 November 2009 from http://www.idsa.in/jds/2_1_2008_NeedforHolisticRestructuringoftheIndianMilitary_VOberoi

Official website of Indian Army, *Command and Control*, Retrieved 2 November 2009 from http://indianarmy.nic.in/Site/FormTemplete/frmTemp1PRM3C.aspx?MnId=HvLJ2i8KsX4=&ParentID=H1aVkriO4/g=

Pal, S. and Selvamurthy, W., *Capacity-Building in Defence Science and Technology: A Perspective from the DRDO*, Strategic Analysis 32:2, 2008, London, Routledge

Peacekeeping and Stability Operation Institute, *India Army Doctrine*, Retrieved 3 December 2009 from http://pksoi.army.mil/doctrine_concepts/Doctrine.cfm

Press Information Bureau, Government of India, *Joint Doctrine of the Armed Forces released*, Retrieved 2 November 2009 from http://pib.nic.in/release/release.asp?relid=17786

Press Trust of India, "New Defence Procurement Policy on November 1", 27 October 2009

Prime Minister's Office, "Cabinet Committee on Security reviews progress in operationalizing India's Nuclear Doctrine", Press Release, New Delhi, 3 January 2003, Retrieved 8 December 2009 from http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html

Rao, R. K., *India's Indigenous Defence Projects and Arjun MBT*, India Strategic, August 2009, Retrieved 9 December 2009 from http://www.indiastrategic.in/topstories361.htm

Reserve Bank of India, *Trade and Balance of Payment*, Retrieved 23 November 2009 from http://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy

Sharma, R., "Defence Ministry may notify companies cleared for Raksha Udyog Ratna status", *The Hindu*, 8 August 2009

Sharma, R., "Overhaul of DRDO likely", *The Hindu*, 26 May 2008, Retrieved 2 March 2010 from http://www.thehindu.com/2008/05/26/stories/2008052659721100.htm

Siddiqui, H., "First JV plans marred by FDI cap, M&M: BAE file fresh appeal", *Financial Express*, 10 December 2008, Retrieved 9 December 2009 from http://www.financialexpress.com/printer/news/396464/

Singh, B. K., *Consolidating India's Military-industrial Complex*, ipcs.org, 4 October 2005, Retrieved 24 November 2009 from http://www.ipcs.org/article_details.php?articleNo=1853

South Asia Terrorism Portal, *India Assessment 2007*, Retrieved 9 November 2009 from http://www.satp.org/satporgtp/countries/india/index.html

Srivastava, S., “India’s military eyes private options”, *Asia Times*, 10 August 2007, Retrieved 28 October 2009 from http://www.atimes.com/atimes/South_Asia/IH10Df02.html

Statistics Sweden, Retrieved 11 December 2009 from http://www.scb.se

The Hindu, “New defence procurement policy to go on stream from Sunday”, 30 October 2009

The Hindu, “Set goal for self-reliance in defence systems: Kalam”, 22 February 2007, Retrieved 9 December 2009 from http://www.thehindu.com/2007/02/22/stories/2007022216841300.htm

Zajec, O., “China becomes adversary number one; India: a giant in full flight”, *Le Monde Diplomatique*, 1 September 2009

Interviews

1. Sweden - India Business Council

Interview with Robin Sukhia, Secretary General of the Sweden–India Business Council took place in Stockholm on 24 November 2009. Participants: Alexander Atarodi (FOI) and Robin Sukhia (SIBC).

2. The Swedish Trade Council

Telephone interview with Ulrika Bohman Troubat and Ajay Sachdeva.

Participants: Ulrika Bohman Troubat (STC) and Ajay Sachdeva (STC) in India and Alexander Atarodi (FOI) and Lars Höstbeck (FOI) in Stockholm. The interview took place on 17 November 2009.

3. India’s defence attaché to Sweden

Interview with Rajiv Edwards, India’s defence attaché to Sweden, took place in Stockholm in November 2009. Participants: John Rydqvist (FOI) and Rajiv Edwards.

Appendix 1: Republic of India, facts and figures

Prime minister: Manmohan Singh

Population: 1.2 billion (UN, 2009)

Capital: New Delhi

Most-populated city: Mumbai (Bombay)

Area: 3.1 million sq km

Major languages: Hindi, English and at least 16 other official languages

Major religions: Hinduism, Islam, Christianity, Sikhism, Buddhism, Jainism

Life expectancy: 62 years (men), 65 years (women) (UN)

Monetary unit: 1 Indian rupee = 100 paise

Main exports: Agricultural products, textile goods, software services and technology, engineering goods, chemicals, leather products [170]

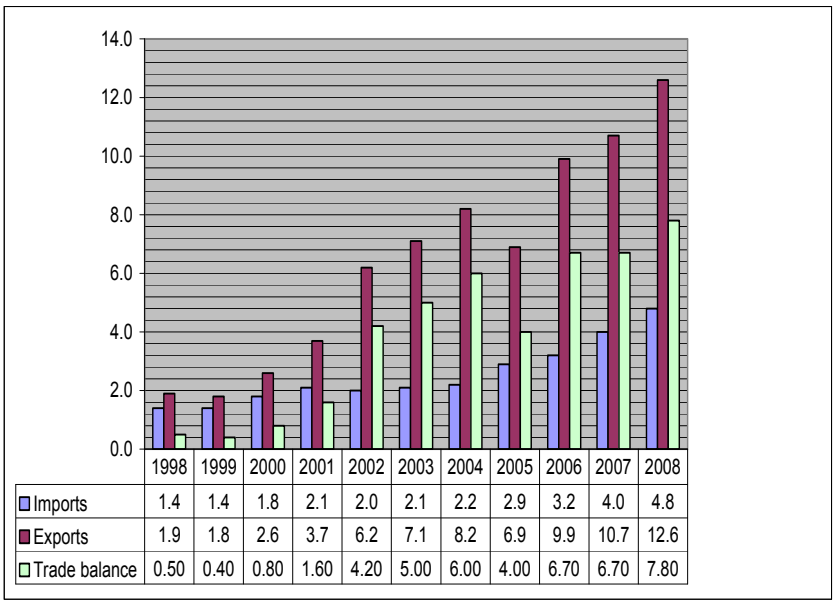
Economy: World's fourth-largest economy at Purchasing Power Parity (PPP 2008) exchange rate.

Ranking	Country	GDP, PPP in billion US$
1	USA	13860
2	China	7043
3	Japan	4305
4	**India**	**2965**
5	Germany	2833
6	United Kingdom	2147
7	Russia	2076
8	France	2067
9	Brazil	1838
10	Italy	1800

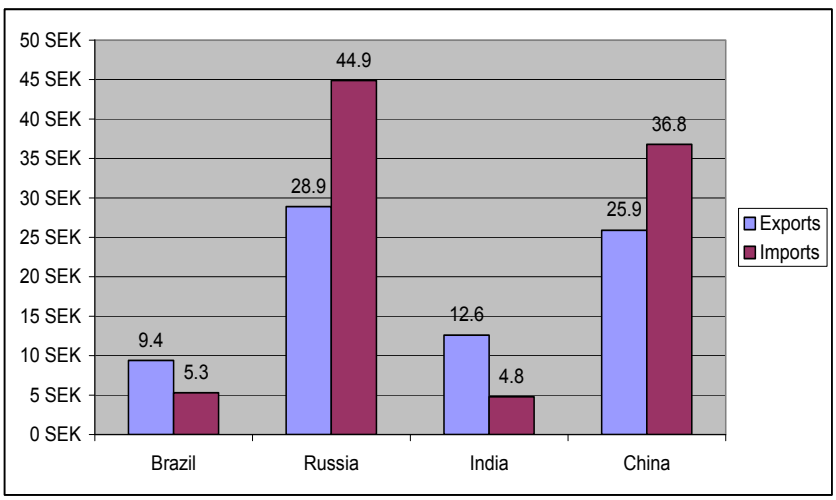
Source: Economy Watch

[170] BBC, *Country profile: India,* Retrieved 19 November 2009 from http://news.bbc.co.uk/2/hi/south_asia/country_profiles/1154019.stm

Appendix 2: Trade between Sweden and India 1998–2008, and Sweden's trade with BRIC countries 2008 in billion Swedish krona

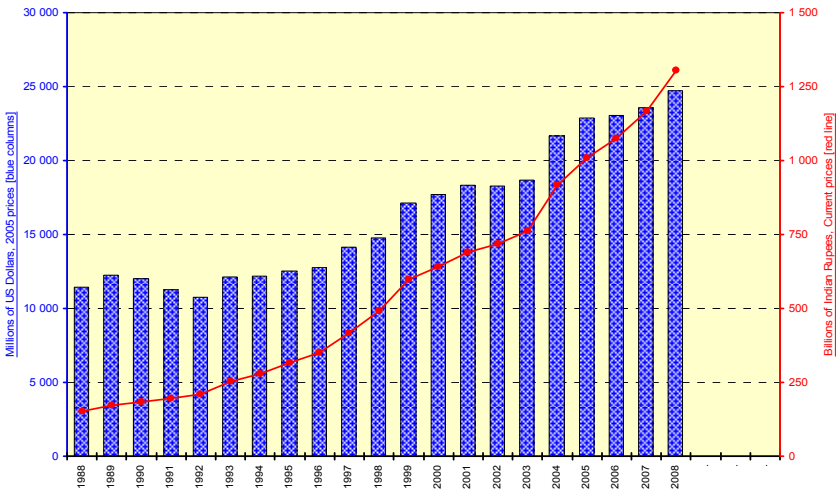


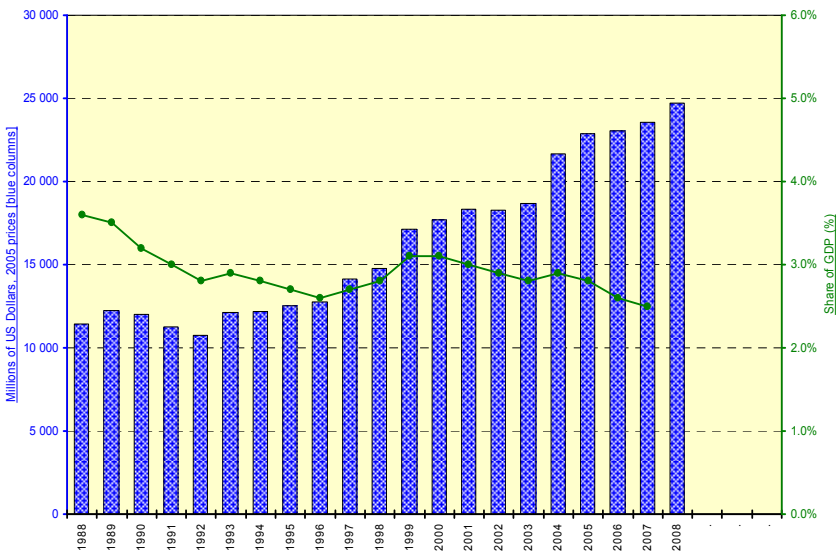
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Imports	1.4	1.4	1.8	2.1	2.0	2.1	2.2	2.9	3.2	4.0	4.8
Exports	1.9	1.8	2.6	3.7	6.2	7.1	8.2	6.9	9.9	10.7	12.6
Trade balance	0.50	0.40	0.80	1.60	4.20	5.00	6.00	4.00	6.70	6.70	7.80



Source: Statistics Sweden, www.scb.se

Appendix 3: India's military expenditure (million US$ and billion Indian rupees), and share of GDP (%) 1988–2008





Source: DATA adapted from SIPRI Database

Appendix 4: DRDO research laboratories

Aeronautics

- Aeronautical Development Establishment (ADE), Bangalore
- Aerial Delivery Research & Development Establishment (ADRDE), Agra
- Centre for Air Borne Systems (CABS), Bangalore
- Defence Avionics Research Establishment (DARE), Bangalore
- Gas Turbine Research Establishment (GTRE), Bangalore
- Center for Military Airworthiness & Certification (CEMILAC), Bangalore

Armaments

- Armament Research & Development Establishment (ARDE), Pune
- Center for Fire, Explosive and Environment Safety (CFEES)
- High Energy Materials Research Laboratory (HEMRL), Pune
- Proof & Experimental Establishment (PXE), Balasore
- Terminal Ballistics Research Laboratory (TBRL), Chandigarh

Combat Vehicles & Engineering

- Combat Vehicles Research & Development Establishment (CVRDE), Chennai (Madras)
- Vehicle Research & Development Establishment (VRDE), Ahmednagar
- Research & Development Establishment (R&DE), Pune
- Snow & Avalanche Study Establishment (SASE), Chandigarh

Electronics & Computer Sciences

- Advanced Numerical Research & Analysis Group (ANURAG), Hyderabad
- Center for Artificial Intelligence & Robotics (CAIR), Bangalore
- Defence Electronics Application Laboratory (DEAL), Dehradun
- Defence Electronics Research Laboratory (DLRL), Hyderabad
- Defence Terrain Research Laboratory (DTRL), Delhi
- Defence Scientific Information & Documentation Centre (DESIDOC), Delhi

- Instruments Research & Development Establishment (IRDE), Dehradun
- Laser Science & Technology Centre (LASTEC), Delhi
- Electronics & Radar Development Establishment (LRDE), Bangalore
- Microwave Tube Research & Development Center (MTRDC), Bangalore
- Solid State Physics Laboratory (SSPL), Delhi
- Scientific Analysis Group (SAG), Delhi

Human Resource Development
- Defence Institute of Advanced Technology (Deemed University), Pune
- Institute of Technology Management (ITM), Mussorie

Life Sciences
- Defence Agricultural Research Laboratory (DARL), Pithoragarh
- Defence Bio-Engineering & Electro Medical Laboratory (DEBEL), Bangalore
- Defence Food Research Laboratory (DFRL), Mysore
- Defence Institute of High Altitude Research (DIHAR)
- Defence Institute of Physiology & Allied Sciences (DIPAS), Delhi
- Defence Institute of Psychological Research (DIPR), Delhi
- Defence Research Laboratory (DRL), Tejpur
- Institute of Nuclear Medicine & Allied Sciences (INMAS), Delhi
- Defence Research & Development Establishment (DRDE), Gwalior

Materials
- Defence Laboratory (DLJ), Jodhpur
- Defence Metallurgical Research Laboratory (DMRL), Hyderabad
- Defence Materials & Stores Research & Development Establishment (DMSRDE), Kanpur

Missiles
- Defence Research & Development Laboratory (DRDL), Hyderabad
- Institute of Systems Studies & Analyses (ISSA), Delhi

- Integrated Test Range (ITR), Balasore
- Research Center Imarat (RCI), Hyderabad

Naval

- Naval Materials Research Laboratory (NMRL), Ambernath
- Naval Physical & Oceanographic Laboratory (NPOL), Cochin
- Naval Science & Technological Laboratory (NSTL), Vishakapatnam

Appendix 5: Defence public sector undertakings (DPSUs)

Hindustan Aeronautics Limited (HAL)

HAL was established in October 1964 in a merger of Hindustan Aircraft Ltd, Aeronautics India Ltd and the Aircraft Manufacturing Depot, Kanpur. HAL, which is the biggest DPSU, is based in Bangalore. Its products include aircraft of Russian and Western origin, helicopters, communication equipment and aerospace equipment.[171] HAL participates in the production of Brahmos cruise missiles.[172]

Bharat Electronics Limited (BEL)

BEL, the second-biggest DPSU, was established in Bangalore by the Ministry of Defence in 1954. BEL's key business is defence-related products, but the company also manufactures products for civilian use. Its products include radars, military communications, electronic warfare systems, and opto-electronics.[173] In fiscal 2008/2009, supplies to the defence sector constituted 85 per cent of BEL's sales. The company's total turnover was 45.2 billion rupees ($940 million).[174]

BEML

BEML (formerly Bharat Earth Movers Limited) was established as a PSU in May 1964. The Indian Government held 54 per cent of BEML shares as of 2008. The company produces equipment for three main consumer sectors: mining and construction, defence, and rail and metro. For the defence sector, BEML mainly supplies different types of vehicles.[175] BEML also participates in the production of Brahmos cruise missiles.[176]

Mazagon Dock Limited (MDL)

MDL was established in the 18th century, was incorporated as a PSU in 1934, and was taken over by the Indian Government in 1960. MDL has developed into a shipyard with products ranging from warships to offshore platforms.[177]

[171] HAL corporate website, Retrieved 9 December 2009 from http://www.hal-india.com
[172] BrahMos Aerospace, *Indian Industries*, Retrieved 9 December 2009 from http://www.brahmos.com/content.php?id=12&sid=12
[173] BEL corporate website, Retrieved 9 December 2009 from http://www.bel-india.com
[174] BEL, *Annual Report 2008-09*, Retrieved 3 December 2009 from http://www.bel-india.com/images/itm-pdfs/AR_2008-09.pdf; USD figure based on exchange rate 1 USD=48 INR
[175] BEML corporate website, Retrieved 9 December 2009 from http://www.bemlindia.com
[176] BrahMos Aerospace
[177] MDL corporate website, Retrieved 9 December 2009 from http://www.mdlindia.com

Garden Reach Shipbuilders & Engineers Limited (GRSE)

GRSE was established in 1884 and was acquired by the Indian Government in 1960. It is one of India's major shipyards and its products range from warships and commercial vessels to small harbour craft and patrol vessels.[178]

Goa Shipyard Limited (GSL)

GSL was established in 1957 and became a PSU in 1967.[179] GSL manufactures and repairs ships for the Navy and Coast Guard, but also for commercial use.[180]

Bharat Dynamics Limited (BDL)

BDL was established in 1970 to be a manufacturing base for guided-weapon systems. Its corporate headquarters are in Hyderabad.[181]

Mishra Dhatu Nigam Limited (MIDHANI)

MIDHANI was incorporated as PSU in 1973 at Hyderabad.[182] The company's products include superalloys, special purpose steels and other special metals and alloys for application in aerospace, defence, atomic energy, power generation, chemical and other hi-tech industries.[183]

[178] GRSE corporate website, Retrieved 9 December 2009 from http://www.grse.nic.in/indnew.htm
[179] Indian Ministry of Defence, *Defence Production & Supply*, Retrieved 9 December 2009 from http://mod.nic.in/product&supp/welcome.html
[180] GSL corporate website, Retrieved 9 December 2009 from http://www.goashipyard.co.in
[181] BDL corporate website, Retrieved 9 December 2009 from http://bdl.ap.nic.in/
[182] Indian Ministry of Defence, *Defence Production & Supply*
[183] MIDHANI corporate website, Retrieved 9 December 2009 from http://www.midhani.com

Appendix 6: Ordnance factories

1. Ammunition Factory Khadki (AFK)
2. Cordite Factory Aruvankadu (CFA)
3. Engine Factory Avadi (EFA)
4. Field Gun Factory Kanpur (FGK)
5. Gun Carriage Factory (GCF)
6. Grey Iron Foundry (GIF)
7. Gun and Shell Factory (GSF)
8. Heavy Alloy Penetrator Project (HAPP)
9. High Explosive Factory (HEF)
10. Heavy Vehicle Factory (HVF)
11. Machine Tool Prototype Factory (MPF)
12. Metal and Steel Factory (MSF)
13. Ordnance Clothing Factory Avadi (OCFAV)
14. Ordnance Cable Factory Chandigarh (OCFC)
15. Ordnance Clothing Factory Shahjahanpur (OCFS)
16. Ordnance Equipment Factory Kanpur (OEFC)
17. Ordnance Equipment Factory Hazratpur (OEFHZ)
18. Ordnance Factory Ambernath (OFA)
19. Ordnance Factory Ambajhari (OFAJ)
20. Ordnance Factory Bhandara (OFBA)
21. Ordnance Factory Bhusawal (OFBH)
22. Ordnance Factory Bolangir (OFBOL)
23. Ordnance Factory Kanpur (OFC)
24. Ordnance Factory Chandrapur (OFCH)
25. Ordnance Factory Dumdum (OFDC)
26. Ordnance Factory Dehu Road (OFDR)
27. Ordnance Factory Dehradun (OFDUN)
28. Ordnance Factory Itarsi (OFI)

29. Ordnance Factory Khamaria (OFK)
30. Ordnance Factory Katni (OFKAT)
31. Ordnance Factory Muradnagar (OFM)
32. Ordnance Factory Project Nalanda (OFN)
33. Ordnance Factory Project Medak (OFPM)
34. Ordnance Factory Tiruchirapalli (OFT)
35. Ordnance Factory Varangaon (OFV)
36. Opto Electronics Factory (OLF)
37. Ordnance Parachute Factory (OPF)
38. Rifle Factory Ishapore (RFI)
39. Small Arms Factory (SAF)
40. Vehicle Factory Jabalpur (VFJ)

Appendix 7: Defence/security policy research institutes

With about 120 think tanks, India ranks sixth among the countries of the world with the most think tanks.[184] Four of those belong to the Armed Forces (the CAPS; the NMF; the CLAWS; CENJOWS) and one (IDSA) is linked to the Ministry of Defence.[185]

Institute for Defence Studies and Analyses (IDSA) http://www.idsa.in/

IDSA is based in New Delhi and was founded in 1965. In 2008 it was named as one of Asia's five leading think tanks and India's top think tank in the Think Tank Index issued by the journal *Foreign Policy*.[186] IDSA conducts research and policy-relevant studies on all aspects of defence and security. It is funded by the Ministry of Defence.[187]

Swedish Foreign Minister Carl Bildt visited IDSA in May 2007.

Centre for Air Power Studies (CAPS) http://www.aerospaceindia.org

The Centre for Air Power Studies was established in April 2002 and is supported by the Indian Air Force. Its activities include policy-related research, study and discussion on problems of national security and defence in the evolving strategic and international security environment.

National Maritime Foundation (NMF) http://www.maritimeindia.org/

The National Maritime Foundation is the Indian Navy's think tank. Its research in the maritime domain includes presenting options for India's national maritime policy.

Centre for Land Warfare Studies (CLAWS) http://www.claws.in/

The Centre for Land Warfare Studies was set up by the Indian Army in New Delhi. Its activities include strategic studies and studies of land warfare in the Indian context.

Centre for Joint Warfare Studies (CENJOWS) http://www.cenjows.in/

CENJOWS belongs to the Integrated Defence Staff and was established in 2007.

---

[184] IDSA, *IDSA Ranked Third among Top 25 Think Tanks in Asia*, Retrieved 24 November 2009 from http://www.idsa.in/IDSA-Ranking_2008

[185] Centre for Land Warfare Studies, *CAPS-NMF-CLAWS-CENJOWS-IDSA Guest Lecture on National Security*, 6 August 2009, Retrieved 24 November 2009 from http://www.claws.in/index.php?action=master&task=376&u_id=36

[186] Foreign Policy, *The Think Tank Index*, Retrieved 23 November 2009 from http://www.foreignpolicy.com/story/cms.php?story_id=4598&page=3

[187] IDSA website, *About Us*, Retrieved 24 November 2009 from http://www.idsa.in/aboutidsa

Institute of Peace and Conflict Studies (IPCS) http://www.ipcs.org/

The IPCS, based in New Delhi, conducts independent research on conventional and non-conventional security issues in the region and shares its findings with policymakers and the public. Its research is divided into seven geographical areas: India, Pakistan, China, the USA and South Asia, Jammu and Kashmir, South Asia and South-east Asia.

Energy and Resources Institute (TERI) http://www.teriin.org/
TERI was established in 1974 and is ranked 11 among Asia's top 25 think tanks in the Think Tank Index. Its research includes development of solutions to global problems in the fields of energy, the environment and current patterns of development. The institute, which is based in New Delhi, has a division for resources and global security which was set up in 2005.

Liberty Institute http://www.libertyindia.org/

The Liberty Institute is ranked 24 among Asia's top 25 think tanks in the Think Tank Index. The institute's activities include research and advocacy on public policy issues. At present, its core areas of interest include development economics, education, the environment, health, security, and trade.

Delhi Policy Group http://www.delhipolicygroup.com/

The Delhi Policy Group is an independent think tank founded in 1994, which seeks to build a non-partisan consensus on issues of critical national interest. The group examines issues relating to public policy in South Asia. These include issues relating to international security; India-Pakistan relations; nuclear weapons testing; the Kashmir conflict; and international relations in the region. Also covered are economic issues, international trade and social policy.[188]

Strategic Foresight Group http://www.strategicforesight.com/

The Strategic Foresight Group was established in 2002. Its focus areas include global shifts, country scenarios, cost of conflict, peace processes, water security and emerging technologies.

United Service Institution of India (USI) http://www.usiofindia.org/frame.htm

The USI was established in 1870 and is India's oldest think tank. Its Centre for Strategic Studies and Simulation was launched in 2005. The centre aims to conduct comprehensive enquiry, research and analyses on national and international security issues, and gaming and simulation of strategic scenarios, to evolve options for wider discussion and consideration.

[188] Intute, *Delhi Policy Group*, Retrieved 24 November 2009 from http://www.intute.ac.uk/cgi-bin/fullrecord.pl?handle=sosig1009982494-17616

Appendix 8: Private companies

By mid-2007, there were about 5,200 companies supplying 20–25 per cent of components and sub-assemblies to state-owned contractors in the defence sector.[189] The Indian companies listed below have obtained licences from the government to manufacture defence items. In 2002, the Department of Industrial Policy and Promotion (DIPP), in consultation with the MoD, issued a list of 16 guidelines for licensing the production of arms and ammunitions.[190]

Mahindra & Mahindra, http://www.mahindra.com/index.asp

The Mahindra brothers and Ghulam Mohammed in 1945 set up Mahindra & Mohammed as a franchise for assembling jeeps from Willys, USA. Two years later, India became an independent nation and Mahindra & Mohammed changed its name to Mahindra & Mahindra. Mohammed migrated to Pakistan after partition and became the first finance minister of Pakistan. The company is based in New Delhi.

Today, Mahindra & Mahindra is India's top vehicle maker. The chief executive of the company's defence systems unit said in November 2009 that it would bid for domestic defence projects worth $3.5 billion over the next seven years. Most of the projects would come from artillery systems and armoured vehicles, the executive said. Mahindra Defence Systems, India's largest manufacturer of armoured vehicles, hopes to ramp up revenues to $430 million by 2016 through joint ventures from the current $21.7 million. The defence unit is divided into two business units focusing on land and naval systems. The land systems unit has obtained the federal government's approval for a joint venture with BAE Systems that will take effect from 1 December 2009 with an initial investment of $21.7 million.[191] In an attempt to improve its ability to deliver defence equipment to India's Armed Forces, Mahindra has initiated recruitment of military personnel.

Tata Group, http://www.tata.com/

The foundations of what would grow to become the Tata Group were laid in 1868 by Jamsetji Nusserwanji Tata when he established a trading company in Mumbai (Bombay).

[189] H. Siddiqui, "First JV plans marred by FDI cap, M&M, BAE file fresh appeal", *Financial Express*, 10 December 2008, Retrieved 9 December 2009 from http://www.financialexpress.com/printer/news/396464/

[190] The full list can be accessed via the website of the Directorate of Standardisation, http://www.defstand.gov.in/Search/generallinks/seminar.aspx#noteno.2

[191] B. Majumdar, "India Mahindra arm to bid for $3.5 bln defence deals", Reuters, 24 November 2009

Tata Group and Israel Aerospace Industries Ltd (IAI) in 2008 agreed to establish a joint venture in India. The joint venture would develop, produce and support defence products, including missiles, unmanned aerial vehicles (UAVs), radars and electronic warfare systems.

In 2004, Tata Group was No.2 on a list of India's most respected companies compiled by the Financial Times and PricewaterhouseCoopers. The list was topped by Infosys Technologies, Ltd.[192]

According to a 2004 Ministry of Defence (MoD) release, Tata Motors Limited, a subsidiary of Tata Group, has been issued industrial licences for manufacturing a diverse range of military vehicles, including light armoured multirole vehicles, heavy tank transporters, special attack and surveillance vehicles, and mine-protected vehicles. In 2006, the Strategic Electronics Division of Tata Power also secured two important orders from the Armed Forces. In less then two years since the promulgation of the offset policy in 2006, Tata has been able to forge a number of partnerships with major global defence contractors such as Boeing, EADS, IAI and Thales.[193]

The product portfolio of Tata is in direct competition with those of many state enterprises, including Hindustan Aeronautics Limited, Bharat Electronics Limited, and ordnance factories, among others. State enterprises would now have to compete with Tata – or vice versa – for products like UAVs, missiles and their components, launchers, radars, and IT and communications systems.[194]

Larsen & Toubro (L&T), http://www.larsentoubro.com

L&T was founded in Bombay (Mumbai) in 1938 by two Danish engineers, Henning Holck-Larsen and Soren Kristian Toubro. The company played a critical role in building India's first nuclear powered submarine, launched on 26 July 2009.[195] Among other projects, L&T participates in the production of Brahmos cruise missiles.[196]

Ashok Leyland, http://www.ashokleyland.com

In 1948, Ashok Motors was set up in what was then Madras (now Chennai), for the assembly of Austin Cars. The Company's destiny and name soon changed with equity participation by British Leyland and Ashok Leyland commenced manufacture of commercial vehicles in 1955.

---

[192] *Financial Times*/PricewaterhouseCoopers, *World's Most Respected Companies Survey 2004*, 2004
[193] Behera, *Tata's Forays into Defence Production*
[194] Ibid.
[195] L&T, *L&T Makes Key Contribution to India's First Nuclear Powered Submarine*, 26 July 2009, Retrieved 9 December 2009 from http://www.larsentoubro.com/lntcorporate/LnT_PRS/PDF/L&TPressRelease-Jul26-2009.pdf
[196] BrahMos Aerospace

Kirloskar Brothers, http://www.kbl.co.in

Established in 1888 and incorporated in 1920, Kirloskar Brothers Limited (KBL) is the flagship company of the $2.2 billion Kirloskar group. The core businesses of KBL are large infrastructure projects (water supply, power plants, irrigation), project and engineered pumps, industrial pumps, agricultural and domestic pumps, valves, hydroelectric turbines, power generation and anti-corrosion products.

HCL, http://www.hcl.in

Founded in 1976, HCL is one of India's original IT "garage start-ups". Its range of offerings spans R&D and technology services, enterprise and applications consulting, remote infrastructure management, BPO (Business Process Outsourcing) services, IT hardware, systems integration, and distribution of technology and telecoms products in India. The HCL team comprises 60,000 professionals of diverse nationalities, operating across 26 countries including 500 "points of presence" in India. HCL has global partnerships with several leading Fortune 1000 firms, including several IT and technology majors.

Godrej & Boyce, http://www.godrej.com

Godrej & Boyce is a conglomerate based in Mumbai and was established as a lock-making firm in 1897. The company participates in the production of Brahmos cruise missiles.[197]

Bharat Forge Limited (BFL), http://www.bharatforge.com/

BFL was established in 1966 and produces components for the global automotive sector.

Infosys Technologies Ltd, http://www.infosys.com

Infosys was established in Pune by N. R. Narayana Murthy and six engineers in 1981. Infosys offers business and technology consulting, application services, systems integration, product engineering, custom software development, maintenance, re-engineering, independent testing and validation services, IT infrastructure services and business process outsourcing.

Infosys develops products for a range of industries, including the aerospace and defence sector. In 2004, Infosys topped the list of India's most respected companies, compiled by the *Financial Times* and PricewaterhouseCoopers.[198]

Wipro Technologies, http://www.wipro.com/

Wipro is an IT services company based in Bangalore.

[197] Ibid.
[198] *Financial Times*/PricewaterhouseCoopers, 2004

Max Aerospace & Aviation Ltd, http://www.maxaerospace.com/

Max Aerospace is one of India's largest private sector MRO (maintenance, repair and overhaul) companies and has been in operation since 1994. The company's engineering facility in Mumbai provides engineering support to all the major commercial airlines and aircraft operators in India and the Middle East.

Anjani Technoplast Ltd, http://www.anjani.com

Established in 1988, Anjani Technoplast's products include personal ballistic protection products, armoured panels, machine tool manufacturing, thermoplastic, thermoset and precision engineering metal parts. The company is based in Noida.

TIL Ltd, http://www.tilindia.in

Formerly known as Tractors India Ltd, TIL pioneered the manufacture of mobile cranes in India. The company's client segments include defence services, oil and petrochemicals, and coal and metal mines. TIL has a partnership with Caterpillar under which it provides services for Caterpillar products. The company is based in Kolkata.

Jindal Group, http://www.jindal.com

The Jindal Group of Companies was founded in 1952 and is based in Gurgaon. The group consists of three companies: Maharashtra Seamless Ltd., Jindal Pipes Ltd, and Jindal Drilling & Industries Ltd.

Ramoss India (website unavailable)

Ramoss India is based in New Delhi. The company's products include bullet-proof vests and -vehicles.

Astra Microwave, http://www.astramwp.com
Astra Microwave participates in the production of BrahMos cruise missiles.[199]

[199] BrahMos Aerospace