ISSN 23939729

CLAWS

No. 94

2021

MANEKSHAW PAPER

Joint and Unified Approach Towards Defence Logistics: An Economic Argument and Recommendations

Ankit Pandey

CENTRE FOR LAND WARFARE STUDIES

Field Marshal Sam Hormusji Framji Jamshedji Manekshaw, MC, better known as Sam "Bahadur", was the 8th Chief of the Army Staff (COAS). It was under his command that the Indian forces achieved a spectacular victory in the Indo-Pakistan War of 1971. Starting from 1932, when he joined the first batch at the Indian Military Academy (IMA), his distinguished military career spanned over four decades and five wars, including World War II. He was the first of only two Field Marshals in the Indian Army. Sam Manekshaw's contributions to the Indian Army are legendary. He was a soldier's soldier and a General's General. He was outspoken and stood by his convictions. He was immensely popular within the Services and among civilians of all ages. Boyish charm, wit and humour were other notable qualities of independent India's best known soldier. Apart from hardcore military affairs, the Field Marshal took immense interest in strategic studies and national security issues. Owing to this unique blend of qualities, a grateful nation honoured him with the Padma Bhushan and Padma Vibhushan in 1968 and 1972 respectively.

Field Marshal SHFJ Manekshaw, MC
1914-2008

CLAWS Occasional Papers are dedicated to the memory of Field Marshal Sam Manekshaw
Photographs courtesy: The Manekshaw family/FORCE.

MANEKSHAW PAPER No. 94, 2021

Joint and Unified Approach Towards Defence Logistics: An Economic Argument and Recommendations

Ankit Pandey

Centre for Land Warfare Studies
New Delhi

BLOOMSBURY

Director CLAWS : Lt Gen (Dr.) VK Ahluwalia
Editorial Team: CLAWS

ISSN 23939729

Centre for Land Warfare Studies
RPSO Complex, Parade Road, Delhi Cantt, New Delhi 110010
Phone: +91-11-25691308; Fax: +91-11-25692347
Email: landwarfare@gmail.com; Website: www.claws.in
CLAWS Army No. 33098

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an independent Think Tank dealing with national security and conceptual aspects of land warfare, including conventional & sub-conventional conflicts and terrorism. CLAWS conducts research that is futuristic in outlook and policy-oriented in approach.

CLAWS Vision: To establish CLAWS as a leading Think Tank in policy formulation on Land Warfare, National Security and Strategic Issues.

Printed in India by
Bloomsbury Publishing India Pvt. Ltd.
DDA Complex LSC, Building No. 4, 2nd Floor
Pocket 6 & 7, Sector – C
Vasant Kunj, New Delhi 110070
www.bloomsbury.com

Contents

INTRODUCTION TO THE MILITARY LOGISTICS ENVIRONMENT AND RESEARCH METHODOLOGY

There is nothing more common than to find considerations of supply affecting the strategic lines of campaign and war.

– Carl von Clausewitz

Introduction

It is said that the storm of dust kicked up by Napoleon's Army could turn the day into night and yet it was engulfed by the fleet of support which used to trail him. The moving Army marched forward, ravishing the countryside as a 'plague of locusts ravishes a field'. Much has changed since the times of Albrecht von Wallenstein and yet Logistics continue to define the operational reach of any modern Armed Forces. In recent history, the Gulf War (1991) was underwritten by Logistics; building the South-west Asia theatre infrastructure, deploying the United States (US) Forces, sustaining the campaign, and bringing the forces and their material back home were major accomplishments. Key to Operations Desert Shield and Desert Storm was the close coordination between logistical and operational commands and the commanders, understanding that Logistics must dovetail with the mission and concept of operations of the projected force.[1]

The twenty-first century has been the century of changing global power equations and the pre-eminence of the role of military in the global affairs. The major powers have undertaken suitable force structuring to augment national power and in the process, developed support and Logistics structures that are swift, responsive, and economic. India too, with the turn of the century, in the backdrop of the 1999 Kargil conflict, has renewed its focus on the military and there has been a realisation that its aspiration of becoming a regional power and a nation of global influence cannot be achieved without the presence of a formidable military which is armed with an arsenal capable to meet its objectives in a conventional or a sub-conventional conflict.

However, much to the focus and realisation, the military reforms have been gradual in coming especially in the area of Logistics within the three services and the synergy between them. With the present pace of reforms, time is fast approaching when the present systems will not augur well with the operational requirements especially in a joint environment. The sustenance issue is both in terms of support systems and more importantly the availability of economic resources for the same.

Consequently, the area of interest of this paper is in the present Logistics systems and deliberates the sustenance of present systems vis-à-vis the

operational requirement. The context is the focus of Jointmanship and the economic imperatives of a growing nation with priorities towards socio-economic development.

Literature Review

The topic of Joint Logistics has been under discussion after the advent of focus on Jointmanship; however, the literature on the subject is finite. Apart from a few articles which have been published by various think tanks, much of the literature focusses on the present issues of Logistics and then suggests a Joint Logistics model as a 'panacea of all evils'. There is a constant reference to the concept of Revolution in Military Logistics (RML) and the various tenets it professes. The major shortcoming of the literature available is that, much of it is generic and does not go beyond articulating the present issues which are quite evident and apparent. Also, the recommendation of Joint Logistics is without assessing the economics of present Logistics systems. This gap is the most glaring since the sustainability of present systems is not examined anywhere. Further, there is almost no mention of specialisations within the Logistics functioning and suggested organisations at various levels. It is this gap which the paper aims to plug and therefore substantive research is focused on quantitative analysis of the Logistics budget over the past 20 years. The recommendations aim at suggesting the various specialisations for the officer's cadre, the organisational level changes, training recommendations, and infrastructure sharing policy. The delivery systems like Distribution-based Logistics (DBL), Vendor Managed Inventories (VMI), maintenance policies, etc., are subsets of the Logistics functioning and therefore are not being discussed. A study of systems followed in other major military powers has also been illustrated to establish the trends being followed.

Overview of Logistics in the Armed Forces

A cursory glance of any of the Logistics organisation which is functioning in the three Armed Forces in India indicates variances which begin right from the definitions, duties, and functions to the cadre/branches carrying out the role. This has been a moot point and brought up at a number of forums; however, the issue has never gone beyond discussions. Broadly the Logistics function in the Army, Navy, and Air Force comprises the following:

(a) **Material.** The principle commonality amongst the three services regarding the Logistics function is a material function, which encompasses the 'provisioning, procurement, and supply of material'. The material

per se ranges from items of general-purpose nature to weapon stores, armaments, specialised equipments, and spares. The total inventory under consideration as per some experts is in excess of 2.6 million items to say the least.[2] There are systems like the Defence Services (DS) catalogue number that is pattern numbers are given to items of common use within the tri-services. Then there is also a North Atlantic Treaty Organization (NATO) classification number also called the NATO Stock Number (NSN) which is common across NATO countries and applicable while sourcing equipment from such countries. However, there is perceptively a considerable amount of duplication in inventory within the three services.

(b) **Finance.** The Financial Management of all the three services with respect to the planning and execution (expenditure) of the budget allotted by the Ministry of Defence (MoD) also falls in the domain of the Logistics cadres of the three services—a very vital function, it got a boost after the implementation of the New Management Strategy (NMS) and then the Delegation of Financial Powers to Defence Services (DFPDS) issued in 2015 and 2016. The DFPDS-16 has enhanced the essence of decentralisation and empowered the field and support units tremendously.

(c) **Pay and Allowances.** The Pay and Allowances of both Navy and Air Force are handled by in-service personnel with dedicated organisations handling calculation and payout. While in the Army, it is completely handled by the Controller of Defence Accounts (CDA). The Policy issues concerning the pay and allowances are completely in-service arrangement with directorates at the Integrated Headquarters of respective services and coordination cells like the Pay Commission Cell. This function is largely automated and has very little contention within the three services.

(d) **Transportation.** The function of transportation is vital to the core Logistics functioning and has been one of the oldest components of Military operations. The classical nature of transportation is still relevant to the Indian Army. The Navy is largely self-contained within the theatre and requirements are limited to the shore-based support functions like setting-up of Operational Turn Around (OTR) bases, etc. The Air Force have a similar role in transportation. The current policy of motor transport procurement is centralised at the MoD level and management/ maintenance functions are decentralised at the level of transport workshops in all the three services.

(e) **Medical.** As brought out earlier, medical services are already organised and executed in a Joint environment. The standardisation of functions, equipments, and the exploitation of infrastructure has led to largely smooth functioning of the medical corps in the joint scenario.

(f) **Repairs.** The function of maintenance of equipments, which may involve preventive maintenance and repairs is happening at a decentralised level with earmarked agencies and branches responsible to carry out these functions. The organisations for such repairs range from the Naval Dockyards to small workshops located with the field units. There is also a significant amount of outsourcing which has formed part of the repair functions with more and more Maintenance Contracts being awarded to Original Equipment Makers (OEMs) for specialised equipment. The concept of waterfront support in the Indian Navy has gained momentum with a number of applications, equipments, and systems getting maintenance support from OEMs directly in the dockyards and bases.

(g) **Works.** As brought out earlier, the Military Engineering Services are also operating in the Joint set-up and have been considerably successful as a model in their execution of tasks and roles.

(h) **Clothing and Rations.** An extremely important and vital component, clothing, and rations are the primary functions of Logistics. It is important to note that conceptually both are based on a joint system. Army Services Corps (ASC) was mandated to provide provisions for the entire Armed Forces. However, over a period of time, both the Navy and Armed Forces (to a large extent) have detached themselves and taken approvals to provide the same by concluding exclusive contracts for their services.

Apart from the functions which are part of Logistics, another interesting feature is that these functions are being carried out by different branches at different levels in the three services. An interesting example is that of the Indian Navy where, at the field and command level, procurement and budgeting is carried out by the Logistics cadre but at IHQ MoD (Navy) the same is carried out by different cadres.

Joint Logistics

In the wake of the Kargil Review Committee (KRC) report and the formation of Headquarters Integrated Defence Staff (HQ IDS), the Indian Armed Forces published the first joint doctrine in 2006.[3] This was the first step in defining the concepts of joint operations in the Indian context. However, there has been a considerable delay in laying out the concept of Logistics in joint operations or peacetime, let alone a doctrinal approach. Therefore, while there exists a

thought process in the desirability of defining a joint or a unified Logistics system and to savour the benefits thereafter, it is only finding its feet now.

Existing Models in Armed Forces

The concept of Joint Logistics in the Indian Armed Forces may be relatively new; however, there have been certain key Logistics functions that have been carried out centrally right from the beginning. The Army Medical Corps is a very apt example of a Joint Logistics function. They have been organised for joint training, staffing, cross deputation, joint usage of infrastructure, equipment, etc. It is also a prime example of how standardisation of processes and equipment has allowed an entire cadre to work in a joint environment. The other two examples are the Military Engineering Services and to a limited extent the processes involved in the procurement of transport vehicles. Therefore, while it may be speculated that Joint Logistics is under the focus as a spinoff from Jointmanship, but it is not an alien concept or a new one.

Joint Approach in Logistics

The primary question to be asked while discussing the concept of Joint Logistics in the Indian context, is to identify the gap, which is required to be filled, or what is the goal which is to be achieved by this conceptual framework. This seems to be the trickiest of the query as there is very little emerging from the services to suggest that present systems are inadequate to require such a transformational overhaul. There is, of course, scope of improvement in the availability of items, inconsistent lead times, the issue of inconsistency of IFAs advice and charter, and other issues which are under discussion. However, the inefficiencies/areas of improvement are generally based on procedures that have been in place with the principal aim of accountability and transparency. In the interim, much of these issues on the field level have been addressed through the promulgation of decentralised financial powers. These have ensured that the field commander gets a lot of flexibility in ensuring an operationally ready state. The scope and amount of local procurement and expenditure have gone up at a great speed; this is an interesting fact because it questions the viability of central procurement procedures and their efficacy. Similarly, it is a well-known fact that shorter processes and supply chains are more responsive and therefore a conceptual framework of Joint Logistics seems to be leaning on a more complex organisation which may defeat its purpose of operational readiness. With that in mind, the next paragraphs will highlight the circumstances which seem to suggest the need for a new approach.

Argument for a Unified Approach

Economic Resources

The biggest argument and an increasingly important one for a conceptual framework of an overhaul of Logistics emerges from the constraint of resources in the future. The amount of resources involved in the present setup is tremendous and it is likely that soon, the Armed Forces will have to look inwards to address this issue. For example, out of the Navy's total Revenue budget in the Financial Year (FY) 2013/14 of ₹12,000 crore, approximately ₹5,500 crore has been reserved for Logistics based functions.[4] In the same FY, the combined figure of Logistics related expenditure of the three services was more than ₹32,000 crore.[5] This amount was higher than the total Naval budget (both revenue and capital) for the same year and a significant amount to be ignored for any kind of assessment for efficiency.

Locked in Inventory

As brought out earlier, experts believe that there are approximately 2.6 million items (as in 2009) in the combined inventory of the Armed Forces. Whilst there are concepts of DS pattern numbers and NATO classification numbers for the identification of common inventory, there is very little asset visibility of this inventory. It may be argued that bulk of the inventories of the Armed Forces are mutually exclusive; however, there is very little proof to validate the argument. The fact that, there is no central inventory management software in the Army and no comparison done by the Navy and the Air Force makes this argument unsubstantiated. The amount of money and resources which are first spent in identifying the required inventory, procuring it, and then warehousing it, is phenomenal. Further, many indirect costs which are attributable to inventory management are simply too high to be overlooked. There is a case for a joint inventory database to identify common inventory that can be cross-supplied to cut down on inventory carrying costs. There is also a very high degree of need for Total Asset Visibility (TAV) across the three services to identify and rightsize inventory holding patterns.

Redundant Processes

The systems and processes which are in place in the Armed Forces are vintages, inherited from the United Kingdom (UK). While there have been certain reforms like the delegation of financial powers and amendments to the Defence Procurement Manual (DPM), they are more focussed on maintaining multiple levels of checks and balances than being efficient and effective. The Armed Forces in their practices have evolved unspoken yet discernible

standards of performance which are acceptable to the commanders on the field. There has been a growing shift towards decentralisation and outsourcing over the years that have been fuelled by the increase in the financial powers of the Competent Financial Authorities (CFA). While this has given more freedom to the commanders to act independently in matters pertaining to Logistics, this has also led to a greater risk from the quality standpoint as there is greater non-standardisation in the items being procured and the lower formations do not have adequate built-in quality checks. Further, the delegation of financial powers in the lower formation has brought about greater 'adhocism' in the approach to procurement and provisioning. In this context, any squeeze in the resources available can severely impact operational readiness.

Economic Constraints

Principally speaking, a shorter supply chain is more responsive and therefore more favoured by the commander on the ground. However, it may not be viable in the long run due to resource constraints and it being inherently more expensive. A simple method to evaluate the growth in need of the three services is to study the year-on-year growth of the revenue budget of the three services. The revenue budget of the three services can be split into the following:

(a) Pay and Allowances;
(b) Oil;
(c) Works;
(d) Stores, Repairs, and Miscellaneous (Logistics).

The classification, as mentioned earlier, delineates Logistics functions and distinguishes with pay and allowances, oil, and works. This classification is only cursory and with the development of the paper shall be refined in the context of the three services. A study of the others can easily tell us the rate of growth of the revenue budget (Logistics) and can indicate whether it is going to be sustainable or not. In the study, oil has not been excluded since it is a major operational cost.

Scope of the Study

The scope of the study restricts itself to the Indian Armed Forces only and the Logistics Services funded through the revenue budget. The Joint Budget (MH 112) in this case will not be considered. The core activities constituting Logistics will be defined commonly for all the three services and the study undertaken thereon.

Approach and Organisation

The study shall first attempt to define Logistics in the Indian context by drawing parallels from US, UK, and PLA models. It will then go on to highlight the organisation which is in place to cater for such functions. It will then attempt to quantify the cost of Logistics for each service and try to draw out the trend of expenditure over the previous 20 years. It will also attempt to look at the ratio of local procurement versus central procurement and study its change over time.

After identifying the growth rates, a qualitative analysis will be carried out to ascertain areas of common functionalities which can be a source of joint staffing, training, and infrastructure requirement and thus future savings. The identification of Logistics specialisations will also be an area of focus here and the study shall flow from this.

Data

The quantitative approach will be based on Controller General Defence Accounts (CGDA) publication *Statistical Handbook on Defence Expenditure* of April 2015 and data available on the internet and the MoD Annual Reports, etc. The qualitative data will be collated from opinions published in books, professional journals, etc.

LOGISTICS SYSTEM IN THE ARMED FORCES OF THE WORLD: LESSONS FOR INDIA

The line between disorder and order lies in logistics.

– Sun Tzu

A cursory glance at the development of the major Armed Forces of the world will lead to the generic observation that, in the process of evolution, capability development was not merely restricted to weapons and platforms but also to the availability of support and mobilisation of both men and materials. In countries like the United States (US) and the United Kingdom (UK), this has been more of an evolutionary process whereas in China the development and modernisation of Logistics was a concerted effort led right from the top.[6] These defence reforms apart from enhancing the operational capability and reach have also brought in much better utilisation of the budgetary resources which are increasingly becoming scarce and under scrutiny. The underpinnings of much of these reforms have been the exploitation of information technology and the best business practices which are prevalent in the commercial sector.

Understanding Military Logistics

A preliminary study of the systems which are being followed in the countries mentioned earlier will allow us to capture the essence of Logistics function and the associated organisations which are responsible for their delivery. Predictably, there is a large degree of unison in the definition of Logistics but with minor diversion with respect to China. A brief has been enumerated in succeeding paragraphs.

The North Atlantic Treaty Organization (NATO)

The NATO Logistics definition seems to be quite comprehensive. It states, "Viewed from the life cycle perspective, Logistics is the bridge between the deployed forces and the industrial base that produces the weapons and materials that the forces need to accomplish their mission".[7] NATO defines Logistics as the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations deal with the following :

(a) Design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposal of materials;
(b) Transportation of personnel;
(c) Acquisition or construction, maintenance, operation, and disposition of facilities;
(d) Acquisition or furnishing of services; and
(e) Medical and health service support.

The United States of America

Defense Logistics Agency

The US Armed Forces are supported by the Defense Logistics Agency (DLA)—a Defense Department combat support agency that is essentially an extension of the North Atlantic Treaty Organization (NATO) doctrine.[8] The DLA was formed after the Second World War and was based on the recommendations of the Presidential Commission headed by the former President Herbert Hoover with an aim to centralise the management of common Military Logistics support and introducing uniform financial management practices.[9] The organisation has evolved over the years to its present form wherein they are the lead organisation for Logistics support to the US Armed Forces. The Agency's responsibilities extend overseas and encompasses every aspect of Logistics operations. The Agency works directly under the US Department of Defense and as such is autonomous from the four services of the US Armed Forces.

DLA contracts for high volume, commercially available items, such as food and medical supplies, based on military service requirements and deliver these items directly to the requesting customer. DLA supplies nearly 86 per cent of the military's spare parts and 100 per cent of fuel and troop support consumables, manages the reutilisation of military equipment, provides catalogues and other Logistics information products, and offers document automation as well as production services to a host of military and federal agencies.[10] DLA's major responsibilities are to:

(a) Buy or contract;
(b) Warehouse when needed; and
(c) Distribute approximately 6 million distinct consumable, expendable, and reparable items.

The United Kingdom

Defence Equipment and Support & Information Systems and Services (DES & ISS)

Just as in the US, the UK also had Defence Logistics Organisation (DLO). The DLO, prior to 2007, functioned directly under the UK Ministry of Defence (MoD), and was responsible for supporting the Armed Forces throughout the various stages of operation or exercise—from training, deployment, in-theatre training, and conduct of operations, to recovery and recuperation ready for redeployment.[11] Alongside the DLO, there was the Defence Procurement Agency (DPA) which was the contracting organisation of the UK MoD. In 2007, both the organisations merged to form the Defence Equipment and Support (DE&S), a trading entity under the MoD. It was further subsumed under the MoD and is currently responsible for the delivery of systems, stores, and other services to the three services and the strategic command under the Minister of State for Procurement. Its present mandate is to manage the vast range of complex projects—to buy and support all the equipment and services that the Royal Navy, British Army, and Royal Air Force need to operate effectively. Their responsibilities include the following:

> *The procurement and support of ships, submarines, aircraft, vehicles, weapons, and support services; General requirements including food, clothing, medical supplies, and temporary accommodation; and Inventory Management.*

Presently. the system which is also known as the Acquisition System is being overhauled under the stewardship of a Permanent Under Secretary (PUS).[12]

People's Republic of China

Defining Logistics

PLA Logistics involves the following:[13]

(a) Supply of materials required for combat, such as food, water, uniforms, equipment, Petroleum, Oil, and Lubricants (POL), ammunition, construction materials, etc;
(b) Transportation of personnel, supplies, and equipment over land, sea, and air;
(c) Medical support;
(d) Finance;
(e) Equipment maintenance, repair, research and development, testing, acquisition, and disposal; and
(f) Building and maintenance of facilities for troops in the field or garrison.

The Chinese Armed Forces or the PLA's Logistics transformation began when in 2002, Hu Jintao, the then Vice President of the People's Republic of China, issued the order to transform PLA Logistics. Once Hu Jintao became China's President and also the Chairman of the Central Military Commission (CMC), PLA Logistics was accorded top priority. Hu Jintao was impressed by the US Logistics setup which was instrumental in the defeat of the Iraqi Military in a matter of days with high levels of technology and weaponry.[14]

General Logistics Department

In contemporary Chinese Military terminology, all logistical functions fall under the concept of "comprehensive support" which includes the separate categories of 'Logistics support' and 'armament (or equipment) support'. The PLA has two separate, but related systems, to manage its "comprehensive support" needs. The first is the national level General Logistics Department (GLD) which oversees 'Logistics Support' and the second is the General Armament (or Equipment) Department (GAD or GED) which has jurisdiction over 'armament support' and is responsible to the CMC. The GLD system is responsible for providing general-purpose supplies to all PLA units' needs, such as food, shelter, uniforms, and fuel, as well as transportation, medical, and financial support. The GLD also oversees the PLA's efforts to grow much of its food and produce its uniforms, equipment, and consumable items in PLA-supervised factories. The PLA does not produce major weapons—weapons production is the responsibility of the 'civilian-run' defence industries.

Indian Armed Forces

Independent Service Level Systems

In comparison, the Indian System is, to some extent, influenced by the British System. The prevailing procedures are old and based primarily on accountability rather than on availability. As brought out earlier, intra-service level Logistics are also not under a unified authority. Most issues are dealt with at the service level and there exists very demonstrative independence amongst the services. Only in the realm of Capital Acquisition (CA), there is the involvement of Headquarters Integrated Defence Staff (HQ IDS) to identify and rationalise common equipment. Major reforms have eluded support systems—a Joint Logistics approach for the Armed Forces.

Centralised Institutions

A critical eye would understand that the procedures involving Logistics are primarily based on procurement and was primitive during a large period of Independent India. Therefore, an almost centralised control was being exercised. Even in the absence of a 'spelled out' Joint Logistics approach, the theme always focussed on the centrality of organisations and institutions. It was only post globalisation, that there was a certain amount of decentralisation of financial powers within the services.

Lessons to be Learnt

At this juncture, it is also important to differentiate the range of operations which the US and the UK undertakes. The US and the UK, under the aegis of NATO, are deployed away from the mainland in most of the operations and operates under the concept of theatre command which is a joint forces amalgamation. There is much doctrinal support for the US Joint Operations and theatre commands and concepts of Logistics have evolved from that base. Therefore, the process has been more evolutionary and lasted over many decades. China, on the other hand, is learning its way through a 'process of evaluation of the latest' in the field of Logistics and therefore has been fast in implementing solutions that have been learned from the experience of both the US and the UK. The Indian story is different. The operations in which the Indian Armed Forces are involved are much in their interior lines of communication and Logistics support in international theatre is a rarity. The concept of Joint Operations is slowly emerging—the realisation has dawned on us a little late. Each service have initiated projects involving information technology but to varying degrees of success. The service-oriented approach has led to a scenario wherein there is very limited interaction between the services themselves on such issues. The road to travel is, therefore, long and challenging.

Revolution in Military Logistics

Military and strategic thinkers believe that any credible military power, which has a mandate of supporting the national interest beyond its land and maritime boundaries, requires a National Logistics Plan (NLP) to ensure that the capabilities acquired or developed are sustained and exploited in the envisaged manner.[15] With the advent of Information Technology in the 1990s, the term Revolution in Military Affairs (RMA) was coined which spoke about the requirement of military modernisation and growth to hinge on the growth of Information Technology. Thinkers then coined a term called the Revolution in Military Logistics (RML). The precise origin of these terms is debatable but is generally attributable to the US Armed Forces.[16] The principle purpose of RML is to know as to what is the actual requirement of the customer (or the war fighter), before requests are accepted. The Logistics pipeline should shrink, the load lightened, and the closing time cut.[17] However, it is more than mere technology induction—it's doctrine, training, leadership, organisations, material readiness, installations, and soldiers.[18] These changes are vital for any RML. While, the first wave of RML focused on exploiting improvements in automation, communication, business practices, reshaping command & control relationships to provide better unity of command and reduced Logistics footprint—it is now also developing distribution technologies that facilitate 'rapid throughout and follow-on sustainment'.[19]

Integration of Logistics Function

It is clear that globally the definition of Logistics is more or less similar and encompasses aspects of procurement, supply, repair, transport, medical services, etc. The Indian context is also quite similar when it comes to understanding and defining Logistics. However, there does not exist a national or a unified definition of the functions of the Armed Forces Logistics. All three services handle their functions separately and there is very little joint or unified approach in handling the requirements. This, over time, has led to non-standardised practices and a degree of adhocism in the processes and functions.

Top-Down Approach

It is essential to understand that the theoretical construct of a unified military logistics is not merely organisations and personnel supporting combat but a national plan to sustain military power. This has a very wide scope and includes national policy on self-reliance, indigenisation development of industrial base, training and development of core competence, economic policies, etc. Unless the thought process is not on a national level, any kind of defence reforms in

Logistics will fall short eventually. This kind of approach is only possible with political involvement and probably a legislative recourse. Also, to be borne in mind is the fact, that the process of reforms and changes will be deliberate and time-consuming. Examples of the US, the UK, and China illustrates that, not only political resolve but also a commitment to reforms have lasted for decades.

EXPENDITURE TRENDS IN LOGISTICS IN THE ARMED FORCES

Don't tell me where your priorities are.
Show me where your money and I'll tell you what they are.
– James W. Frick

Classification Handbook

The audit and account of defence expenditure is the responsibility of the Controller General of Defence Accounts (CGDA). The CGDA, for the purposes of recording the expenditure, has published a *Classification Handbook* (*CHB*), which is a compendium of major heads, minor heads, detailed heads, and code heads; every rupee spent by the Defence Services (DS) must be recorded under these classifications. The CGDA also publishes a report every month known as the CGDA compilation which indicates service wise expenditure on every code head.

Logistics Code Heads

The classification of expenditure that has been codified through the CHB allows us to identify those expenditures which can be attributed to the logistical aspects of the services. A summary distinction is presented in Table 1.

Table 1

Army: Major Head 2076		
Minor Heads	***Description***	***Category***
101	Pay and Allowances: Service	Pay and Allowances
103	Pay and Allowance: Auxiliaries	
104	Pay and Allowances: Civilians	
105	Transportation	Logistics
106	Military Farms	Logistics
107	ECHS	
110	Stores	Logistics
111	Works	Civil Works

112	Rashtriya Rifles	
113	NCC	
800	Miscellaneous	Logistics
Navy: Major Head 2077		
Minor Heads	***Description***	***Category***
101	Pay and Allowances: Service	Pay and Allowances
102	Reservists Pay and Allowance	
104	Pay and Allowances Civilians	
105	Transportation	Logistics
106	Repairs and Refits	
110	Stores	
111	Works	Civil Works
112	Joint Staff	IDS
800	Miscellaneous	Logistics and Support Services
Air Force: Major Head 2078		
Minor Heads	***Description***	***Category***
101	Pay and Allowances: Service	Pay and Allowances
102	Reservists Pay and Allowance	
104	Pay and Allowances Civilians	
105	Transportation	Logistics
110	Stores	Logistics
111	Works	Civil Works
200	Special Projects	
800	Miscellaneous	Logistics

Source: Classification Handbook

Understanding Logistics Code Heads

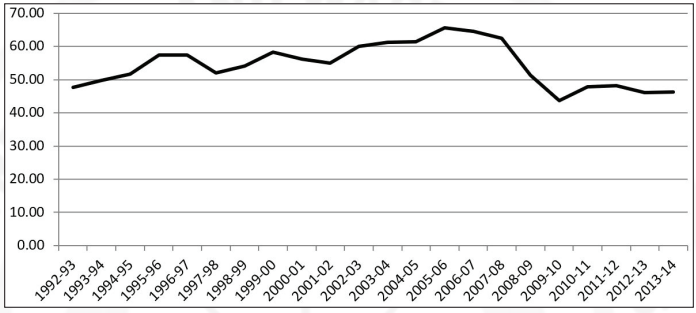
While the categorisation of the minor heads mentioned earlier gives a clear indication as to what generally will constitute Logistics related expenditure, it does not, however, give the granularity in terms of kind of stores, expenditure on stores procured from OFs, expenditure on DPSUs, etc. While the data is available with service Headquarters (HQs) and CGDA, it is not available centrally in the public domain. Also, unlike the Navy, the repair expenditure of the Army and the Air Force is given under stores, therefore the findings of this section will be accurate to the trends but will require a bit more refinement for exact figures. Another major component of the revenue expenditure is the cost of fuel which has been included in the cost of logistical services.

Logistics Trends within Services Revenue Budget

Navy

The Naval experience with the Logistics component of the revenue budget is not similar to the other two services (brought out later). The component has been growing and from a figure of a little under 50 per cent went up to 65 per cent before the implementation of the 5th Pay Commission which had resulted in hiking of Pay and Allowances (P&A). Even after the initial dip to a little above 40 per cent, it has risen and steadied to a level of approximately 46 per cent (Figure 1).

Figure 1: Navy: Logistics/Revenue (%)

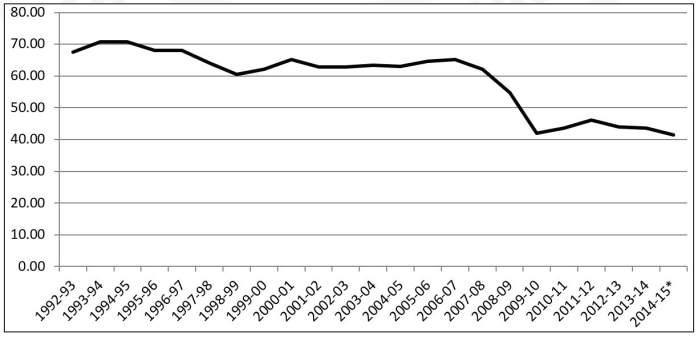


Source: CGDA Compilation Report

Air Force

The Logistics component of the revenue budget in the Air Force has been steadily decreasing from 70 per cent in 1992/93 to about 40 per cent for the last 5 to 6 years. There was a sharp decrease in 2007/09 from 62 per cent to 42 per cent which may be attributed to the implementation of the 5th Pay Commission. The expenditure has been steady since then (Figure 2).

Figure 2: AF: Logistics/Revenue (%)

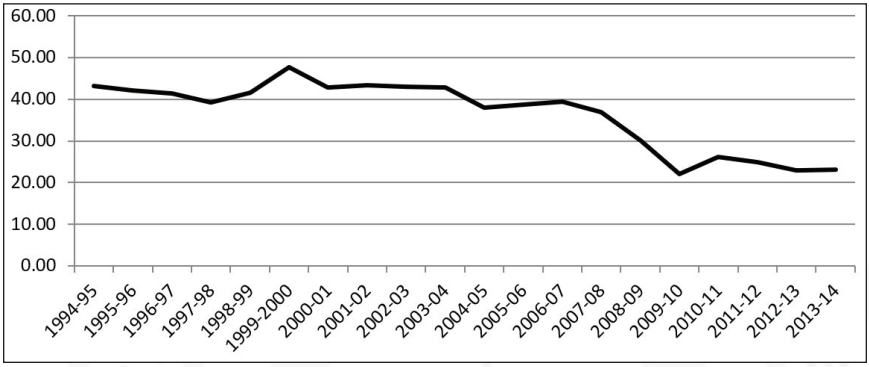


Source: CGDA Compilation Report

Army

In the Army, the Logistics component of the revenue budget was around the 40 to 50 per cent mark till about 2007/08 wherein there was a reduction again presumably due to the implementation of the 5th Pay Commission Report. After that, the component has steadied around the mid-20 per cent range (Figure 3).

Figure 3: Army: Logistics/Revenue (%)



Source: CGDA Compilation Report

Analysis

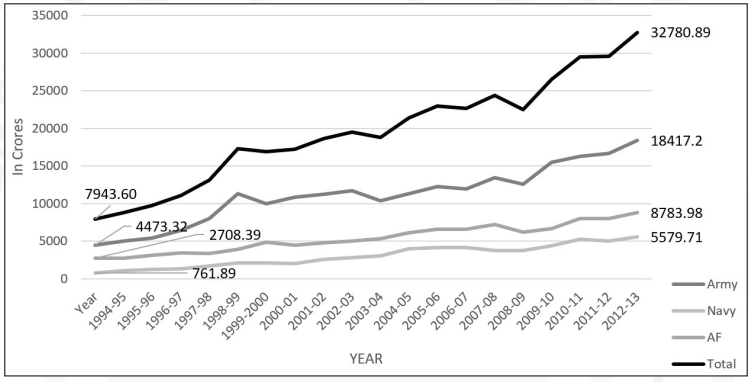
The earlier mentioned data pertaining to the three services indicates very clearly that the Logistics component in the revenue budget of the three services has been on the decline. The primary reason being the factor of the P&A component and its increase over a period, which has surpassed the growth in logistical functions steadily. Obvious deductions are representative of the Army revenue budget wherein the Logistics component is the lowest. However, if trends are to be seen, then in both—the Air Force and the Army, the component has been steadily decreasing but in the Navy, the trend has been different wherein there has been a steady increase till the implementation of the 5th Pay Commission. Even after, there has been steadying up of the component share and there is still no reversal of the trend. Similarly, in the Air Force, while the trend has been on the decline, the initial share has been the highest despite the fact that the Air Force has a much higher number of personnel than the Navy (almost 2.5 times for P&A factor). This could be indicative of the higher maintenance cost or maybe non-optimised processes. Another factor contributing to the trend can be the reduction of budgetary resources over the years. That will be verified in the evaluation of the combined resource evaluations.

Combined Logistics Outlook for the Services

Total Quantum

It is quite evident that the Logistics component of the Armed Forces involves a significant amount and has risen from a total of about ₹8,000 crore to about ₹32,700 crore since 1994/95 (Figure 4). In terms of increase, it is a cumulative increase of 15.63 per cent over the 20 year horizon. This is an interesting figure since it is more than the inflation and the Gross Domestic Product (GDP) growth rate in macro-economic terms and means that there is a real increase in resource allocation over the years. This brings us to the initial assumption for the hypothesis that the growth in terms of Logistics services in the long term is not sustainable both from the economic growth and the socio-economic point of view.

Figure 4: Armed Forces Logistics Budget



Source: CGDA Compilation Report

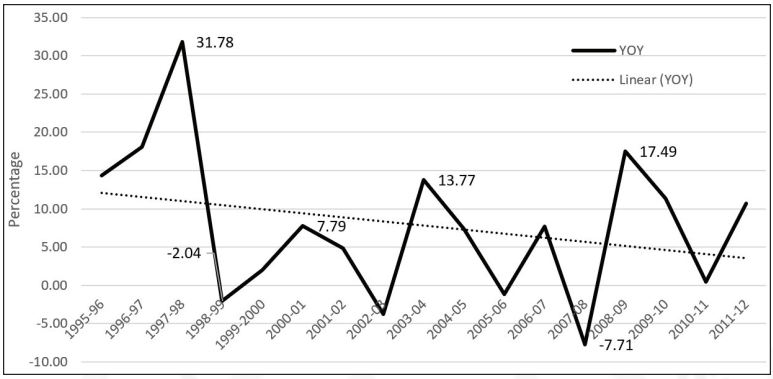
Year-on-Year Increase and Trends

As brought out earlier, the cumulative growth rate is indicative of the real resource allocation for the Logistics function. It is, however, important to ascertain the trend of this growth. The graph (Figure 5) indicates the inconsistency over the years wherein the changes have been close to 33 per cent over a single Financial Year (1998/99). Then, from 1999 to 2008 has seen only an increase of 3 per cent annually. This has also manifested in the declining ratios of Logistics expenditure in the same period. There have been improvements in the allocations since; however, these are again explicit indicators of times to come.

The linear trend line also re-enforces the declining trend over-allocation of resources for the Logistics services. While the Year-on-Year trends are inconsistent, to say the least, the trend line has a significant negative slope.

This again supports the assumption that the general trend is going to be a decline in resource allocation.

Figure 5: Year-on-Year Changes



Source: CGDA Compilation Report

SUMMARY OF FINDINGS

As I have said many times, there can be no revolution in military affairs without having a revolution in military logistics.
– General Dennis Reimer, Army Logistician, US Army

Throughout history, the concept espoused by Martin van Crevald in his seminal work *Supplying War* that operational planning has to be guided by logistical realities hasn't escaped Military Commanders.[20] While this refers to the planning of operations and therefore pertains to the realm of Operational Logistics (OPLOG), it is imperative to understand that, just as "training is peace" is vital to performance in battle, similarly preparing ourselves during peacetime will ensure that operational reach is maximised. The experience gained by the countries that have seen more active conflict zones in conventional and sub-conventional domains allows us to gain from their lessons and help us avoid the same mistakes.

Vintage Logistics System in India

From the study above, it is quite clear that, we are still evolving from a primitive model which is of Second World War vintage. All the major military powers have resorted to a unified system of Logistics wherein the synergy of efforts has resulted in better and responsive supply chains, better financial prudence, and a 'much-integrated' environment with the industry. The developments in China in recent years are also a testament to the efficacy of unified systems for the three services. The defence reform process which led

to the establishment of the HQ IDS did result in discussions on the matter and there has been an evolving consensus regarding the requirement of the joint approach. The JAPC at HQ IDS however, is yet to promulgate any major document on the need or approach towards Logistics in a joint or integrated environment. The diversity in the functions and the inconsistencies in the manpower being assigned to handle the said functions, are also a point of concern since the bulk of functioning in Logistics requires specialist knowledge of the supply chain, management, finance, and service rules & regulations and affect the efficacy of organisations and procedures. The adhocism like manpower employment is also a major moot point and a key result area for any meaningful reforms. Thus, the study does support the hypothesis that there is a need to relook towards the current systems and processes for improving the Logistics services available to the force.

Economic Imperatives

Budgetary Constraints

The analysis of various co-relations suggest that, there has been a significant improvement in intra-service performance with the downward trend in the Logistics component vis-à-vis the revenue component in the Air Force and the Army, and stabilisation in the Indian Navy. The induction of technology in the Indian Navy and the Air Force has also proved to be a great tool in improving efficiencies. However, when we look at the combined Logistics figures of the three services (₹32,000 crore), the rate (15 per cent annually) at which they are increasing, and the erratic year-on-year trends, it is easy to deduce the following:

(a) The rate of 15 per cent is not sustainable in the near future.
(b) The allocation trends indicate a substantial decrease since the turn of the century.
(c) It is unlikely that the pace can be carried on in wake of the socio-economic realities of a developing nation.

Inventory Management

The inventory, which is lying in the various warehouses, bears a testament to archaic processes of inventory management which overtly focusses on stockout cost excluding the carrying costs. Media reports about the huge gaps in the operational capabilities of the forces which surfaced in March 2012 and captured the attention of the nation, are an indication that besides procedural delays the system is structurally not geared to meet the requirements of the Services.[21] One of the key features of an efficient inventory system is

TAV. The Indian Army, which probably has the largest inventory among the three services, has been challenged with implementation of the Centralised Inventory Control Project (CICP). With increasing focus on socio-economic development and the probable reduction in the availability of resources for defence in the future, there is an urgent need to synergise available resources and achieve greater efficiencies. There is also a need to harness the capacities of organisations that are already in place like OFs to generate more resources and utilise the value they can bring in. A case in point being the change in Central Procurement (CP) and Local Procurement (LP) of naval stores (code heads 636/01 and 636/02). Data indicates that since 2012, LP has increased to 14 per cent from an earlier 11 per cent in relation to CP in 2016.[22] Thus, the economic scenarios also explicitly prove our initial assumption.

The subjective analysis of the best practices across major military powers and the study of budgetary data pertaining to the Indian Armed Forces quite conclusively support the assumption that there is a need for a relook in the way the services and delivery systems are designed especially in the context of jointmanship, focus on increasing operational reach, and the growing strain on available economic resources.

WAY AHEAD AND RECOMMENDATIONS

The Macroscopic View

The developments of the various Armed Forces across the world indicate a strong recommendation for a unified or a joint Logistics system. However, much like the similarity of several areas in the functioning of Logistics in the three services, there is much disparity especially in the material and repair functioning amongst the three services not to mention issues persisting intra-services as well. Therefore, despite a well-meaning intent, there is much to be understood while devising a transformation of the current Logistic systems of the three services. Any changes in the current system can only occur with due diligence to the 'nuts and bolts' of the present processes. It is fine to recommend a joint model for a more efficient and vertical system of management of the Logistics system, but it manifests itself into a very complex process with probable disruptions on the ground.

Finding New Ground

The literature on the recommendations for a Joint Logistics system is scarce and generally found in think tank publications and monologues only. The assumptions for a Joint Logistics model have been based on qualitative analyses

of the present organisations but there has been no descriptive quantitative analysis to ascertain the economics of the present setup.

Recommendations

Concept of Recommendations

The following recommendations are categorised as under:

(a) Operational considerations and a responsive supply chain;
(b) Segregation of the present functions into verticals and generalist specialisation;
(c) Suggested organisational changes; and
(d) Roadmap for transformation.

Operational Considerations

The biggest justification for a unified system beyond the economic resources constraint, is related to the benefit it will accrue to the operations it is meant to support. The concept of a unified approach includes the beginnings of a more professional approach to Logistics and a more responsive supply chain at the field level. This will also be suitably augmented at the highest level within the theatres and services. As brought out earlier, a unified Logistics organisation is not contingent upon the theatre command structure but will benefit from such a structure.

Segregation of Functions

The Logistics and allied functions are specialist functions and the question of specialisation has only strengthened over time. There have been numerous initiatives taken to ensure that officers are trained to be 'up-to-date' with the best practices of Logistics functioning. This aspect, however, could not be applied towards specialist fields within the Logistics services presumably due to lack of necessary manpower and consensus on the issue. This is the basis of the first set of recommendations which aims at creating vertical specialisations. They are as under:

(a) **Vertical Functions/Specialisations.** The vertical functions or specialisations will address the certain key areas which are largely common to the three services, are bound by common regulations and therefore, are similar in the three services. While some of the vertical functions would be easier to transcend into, there are verticals that are service-specific, and therefore would require a more detailed plan. Officers and men shall be trained with respect to the vertical functions

and will be continuously tasked with similar roles but with different levels of responsibility.

(b) **Generalist Functions.** These are those important but subsidiary functions that will be expected to be performed by all officers irrespective of their vertical specialisation. These are functions that are expected to be performed by officers carrying out Logistics Officer's duties in various units.

Identification of Functions

Vertical Functions

The suggested vertical functions are as follows:

(a) Procurement;
(b) Financial Management;
(c) Victualling/Rations;
(d) Clothing Management;
(e) Material/Supply Chain Management;
(f) Capital Acquisition;
(g) Ordnance Management; and
(h) Pay and Allowances.

Generalist Functions

The suggested generalist functions are as under:

(a) Legal Advisor;
(b) Catering Duties; and
(c) General Administration.

Vertical Functions

Procurement

A major area of operation of Logistics functioning revolves around the activity of procurement. This is carried out at all levels and typically consists of Central Procurement (CP) or Local Procurement (LP). This may be carried out at the service headquarters level, formation headquarters or down to a unit level. The rules regarding the revenue procurement for the three services are the same and are presently governed by the *Defence Procurement Manual 2009* (*DPM-09*). The Manual lays out the methodology of carrying out revenue procurement through public funds and entails a wide variety of scenarios and procedures which are applicable for carrying out public expenditure. This function presently is being carried out by several officers of various cadres across the three services. The function is extremely important

and requires a degree of specialisation especially when CP and high-value contracts are concerned. With the devolution of financial powers through the newly introduced Delegation of Financial Powers to Defence Services in 2016 (DFPDS-16), the powers of the lower CFA have increased significantly and the procurement responsibilities have grown exponentially and are to be carried out with due diligence.

Financial Management

The financial management within the three services comprises the budget planning and execution functions. The three services, at different levels, have diverse mechanisms of handling budget related activities. The intricacies of planning, forecast, and execution in the budget rise with the level and therefore, it is important that this activity is handled by personnel who understand the budgeting process in toto especially the budgetary aspects inter alia with the Ministry of Defence (MoD) (Finance). The functioning especially at the service Headquarters (HQs) level requires a significant amount of coordination with the MoD, the various offices of the CDA, and lower formations. All officers handling budgetary functions at a brigade, squadron or fleet level must understand the intricacies of budgetary procedures, rules, and regulations. This will lead to a better organisation where significant efficiencies can be achieved due to a more comprehensive understanding of the procedures and challenges involved.

Victualling/Ration

The victualling or the ration function pertains to several processes involved in the planning, procurement, inspection, storage, and delivery of the rations, both dry and fresh. The CP of dry ration for all three services was initially the mandate of the ASC. However, with time and due to geographical considerations, this was delinked to the various services and they undertook this function independently. A case in point is the Indian Navy that has completely delinked itself with ASC with regards to rations. The ration scales of the personnel of the three services are the same except with regards to some additional scales for personnel who are operating in specific circumstances. However, in places where all the three services are operating jointly, the ration management functions are being handled separately by the three services. For example, in Mumbai which has a sizeable naval component, along with the Army and the Air Force, the three services are looking after their needs independently. Having a unified or joint structure in place will allow better management of services and economies of scale.

Clothing Management

The clothing function of the three services is also guided by similar procedures; however, differs in execution. The Army sources bulk of its clothing from the OFs and resorts to LP only on certain occasions. The Navy and the Air Force have, over a period, delinked themselves from the OFs and undertook CP at service HQs and a significant amount of LP at the command level. While the basic functions are planning and procurement, there is a requirement to understand the nuances of cloth & footwear design and inspection which are critical in the selection of uniforms. Again, while it seems that the bulk of the process hinges on planning and procurement, most of the time is spent on the selection of sources that can provide the items with the selected parametres. There have been instances wherein repeat orders have not been given to vendors due to non-conformance to specifications in a large order. The field of clothing and footwear is a niche area requiring adequate expertise and knowledge to harness the best sources with the required items.

Material and Supply Chain Management

One of the biggest responsibilities of any Logistics support provider is to ensure that the right material is available at the right time in the right amount and cost. The Navy and the Air Force are equipment-intensive services. The inventory is varied and characterised by diverse sources of equipment, spare parts, types, varying degree of obsolescence, lead time for procurement, and the rate of replacement—all these parametres make Material and Supply Chain Management the most challenging feature of today's logistical functions. A major portion of training and emphasis are dedicated towards handling this function. A fair degree of automation has also been achieved in these functions in the Navy and the Air Force like the Integrated Logistics Management System (ILMS) and the Integrated Material Management Online System (IMMOLS). These systems have allowed a considerable migration to an automated system for planning and procurement, thereby achieving a higher material availability state for the two services. The Army has also made efforts together with the Centralised Inventory Control Project (CICP) for the ordnance corps. Therefore, a joint approach towards Logistics will heavily rely on the specialisation and synergy in the field of Supply Chain Management and Material Management.

Capital Acquisition

The Capital Acquisition (CA) in the three services is a procedure intensive process and there is much merit in the vertical training of officers of the three services in the matters of capital acquisition. The acquisition of capabilities in

the services is driven through a multitude of long- and medium-term plans. There are numerous organisations involved in processes—intra-service, inter-service, and intra-ministry. Several committees are involved in the process and the HQ IDS has also found a nodal role for itself when it comes to the CA process. Apart from the aspect of specialist advice on defining the capability through the Staff Requirements (SRs), the CA process is completely driven as per the terms of the relevant Defence Procurement Policy (DPP). The services currently employ specialist officers in the respective acquisition wings who have very limited knowledge on either DPP or the process of acquisition. The officer concerned must put in considerable effort to understand & execute the process and plan for contingencies that may arise. The on-the-job nature of their progress is very personality-based and this puts the services at a considerable disadvantage through the progress of the cases.

Ordnance Management

The management of Ordnance in the three services is carried out by specialist officers who are trained for its management. These officers should be able to cross-function in other services to optimise their utilisation. The connotations of Ordnance Management will also include the principles of Supply Chain Management and Inventory Management.

Pay and Allowances

The complexities of the present system of Pay and Allowances (P&A) alone merit specialisation just like other verticals. The rules and regulations are common across the three services and yet the interpretation of rules and regulations can find some diversity. Just as it is a key function at the field level, there is also a great need for understanding policy issues that emerges at every pay commission. Issues that have been pending from previous commissions require an organisational approach and institutional memory to ensure that time delay does not dilute services positions.

Generalist Functions

Generalist functions are those functions that are expected to be performed commonly by all officers who are performing these duties. This is not to suggest that Logistics officers will not be exposed to other vertical functions. They must be introduced to preliminary concepts and functioning of all the vertical fields in the ab initio training itself. The other subjects which the officers must be trained in includes catering management, issues pertaining to general administration, and legal advice. These functions are expected to

be performed by almost all officers in various roles; in secondary and even primary duties.

Organisational Changes, Infrastructure, and Training

The efficacy of any organisation lies in its degree of independence and its accountability towards the achievement of its intended goals. While all commanders would like to have all elements affecting operations under their control, it might not be feasible under a joint system for lower levels. For an organisation addressing all three services, certain changes must be carried out to ensure equity in coverage and avoidance of duplicity. The organisational changes which follow stems out of geographical support systems and are service independent for common items and services.

National Level

There is a need to constitute a national task force specifically for streamlining the Logistics setup not only for three Services but also for all the security forces of the country to enable them to be cost effective and responsive. The task force should comprise all stakeholders including representatives from respective ministries and be preferably chaired by a minister. The Minister of State for Defence could also chair such a task force that may include some members from reputed think tanks. The recommendations of the task force should be converted into legislation through Joint Parliament Committee on Defence for implementation. This will also address the issue of government ordinances for minor changes in the organisations and procedures which is generally felt during implementation.[23] One of the likely recommendations is the merging of the Department of Defence Production into the Defence Logistics framework with a service officer exercising control over these to ensure better compliance to their mandate.

Headquarters Integrated Defence Staff

The present organisation, at the HQ IDS level, has a Joint Administration and Planning Committee which is responsible for Logistics planning of operations. There is no doctrinal approach towards peacetime preparations or any reforms or policy changes. It is recommended to have the Chief of Defence Logistics (CDL) under the CDS. The CDL should also be a member of the Defence Production Board (DPB). The CDL will be responsible to the MoD through CDS for all matters pertaining to Defence Logistics and defence production. He will be the principal policymaking authority in the DS along with the charter of manpower employment for the three services as well. CDL will also be directly responsible for the management of

training infrastructure across the services for aspects related to training and curriculum. Other organisations under CDL should be the Directorate of Standardisation, Directorate of Quality Assurance, and Director General of Ordnance Factories for better accountability and efficiency.[24]

Head Quarters Ministry of Defence and Command

A PSO level officer of three-star rank should be responsible for the execution of all tasks related to logistics within the services. There will a requirement to re-organise all structures to merge into a unified organisation that is responsible for all logistics related matters pertaining to the service. There shall be an emphasis on removing duplication of effort in handling logistics related issues and sharing of infrastructure and resources. The organisation will be replicated at the Command level with a similar re-organisation effort.

Sharing of Responsibilities

The unified approach should ensure that similar functions of the three services in geography will be carried out by single agencies. The lead service could be decided based on the numerical strength of the supported force as well as manpower or equipment intensity. This will be a major field level change that is envisaged and working on the concept of regional hubs.[25] The regional hubs should be responsible for the management of geography irrespective of the supported services. All infrastructures which have been created by either service should be pooled into a joint resource pool and the feasibility of better utilisation should also be explored.

Training

The existing training infrastructure can be optimised for the training of specialist officers amongst the three services. Having placed each of them under CDL for curriculum and training purposes, each can be utilised to create institutions of excellence in defence logistics.

Roadmap

The roadmap for the recommendations must begin with a consensus amongst the services to at least recognise the advantages of a unified system. This must be followed up by giving a presentation to the MoD and convincing them to invest time and resources for this transformation. This should be followed by the composition of a task force as envisaged earlier. Simultaneously, the intra-service level changes are required to be incorporated along with organisation level changes at HQ IDS. The roadmap must follow specific timelines.

Challenges

Any change to an existing system is going to be fraught with resistance. Any change management consequently must include measures to counter this resistance and cater to the temporary disruptions it might cause. The unified logistical concept, which has been proposed, is not just that of transformational change for the functions itself, it also bears the connotations of changing command & control dynamics both within the services and outside them.

Revolution in Military Logistics

Finally, no organisation and training will be complete if the tenets of Revolution in Military Logistics (RML) are not indoctrinated into the approach of handling issues; there is no circumventing technology, business best practices, association with the industry, and discernible standards of excellence in supply & distribution. RML is going to be the basis of all solutions, processes, actions, and organisations. The opening quote summarises it quite aptly since RML is the only way.

NOTES

1. Pagonis William and Krause D Michael, "Operational Logistics and the Gulf War", *The Land Warfare Papers No 13*, The Institute of Land Warfare, United States Army, 1992.
2. S. Bhalla, "Joint Logistics: The Way Forward", *Journal of Defence Studies*, Vol. 3, No. 3, IDSA, 2009.
3. Ali Ahmed, "Military Doctrines: Next Step", IDSA Comment, IDSA, 16 August 2010.
4. CGDA, *Statistical Handbook on Defence Expenditure*, 2015, p. 22.
5. Ibid., pp. 22-24.
6. Qingren Shi, "China's Military Reforms: Prospects and Challenges", Asia Paper, September 2014, Institute for Security and Development Policy, 2014, p. 8.
7. NATO, *NATO Logistics Handbook*, 2012, p. 20.
8. Defence Logistics Agency, "DLA Fact Sheet", 2017.
9. "History", http://www.dla.mil/AboutDLA/History.aspx, accessed on August 5, 2016.
10. "At a glance", http://www.dla.mil/AtaGlance.aspx, accessed on August 5, 2016.
11. "Ministry of DET&S", http://webarchive.nationalarchives.gov.uk/+/http://www.mod.uk/DefenceInternet/MicroSite/DLO, accessed on August 17, 2016.
12. UK MoD, "How Defence Works (4.2)", 2015, p. 34.
13. Blasko J Dennis, "Chinese Military Logistics: The GLD System", China Brief, Vol 4 Iss 19, 2004, www.jamestown.org, accessed on August 17, 2016.
14. David A Payne, "Chinese Logistics Modernisation", *Army Logistician*, Vol 40, Iss 4, 2008, p.10.
15. Vinod Anand, "Joint and Integrated Logistics System for the Defence Services", 2006, www.idsa-india.org/an-apr-6.01.htm, accessed on August 19, 2016.
16. Farrand Dae Lee, "The Revolution in Military Logistics: Is it Enough?", US Army Command and General Staff College, 2006, p. 7.

17. Charles S. Mahan Jr., "The Challenges of Fielding: The Army's Objective Force", *Army Magazine*, October 2001.
18. William Grisoli, "Army Transformation", Department of the Army Transformation Office, Carlisle: U.S. Army War College, 2002.
19. Pigee Aundre, "Transformation: Revolution in Military Logistics", US Army War College, 2002, p. iii.
20. Wilkinson Keith, "The Logistics Lessons of the Gulf War: A Snowball in the Desert", US Naval War College, 1993, p. 1.
21. Josy Joseph, "Panel Finds Chinks in Army's Armour", *Times of India*, 26 April 2012.
22. CGDA, "CGDA Compilation Report", 2012/13, 2013/14, and 2014/15, 2015/2016.
23. Saini Varinder Kumar, "Theaterised Joint Logistics: A Calibrated Initiation", IDSA Monograph Series No. 15, 2013, p. 56.
24. Ibid.
25. Ibid.

Commander Ankit Pandey was commissioned in the Logistics Branch of the Indian Navy in 2004 and has tenanted various field and staff appointments dealing with Military Logistics including heading a Victualling Depot in the tri-services command. He is an alumnus of DSSC Wellington and National Defence Academy and have studied specialist courses in School of Logistics and Management at BNS Titumir, Khulna, Bangladesh and Post Graduate Diploma in Financial Management from the National Institute of Financial Management (NIFM), Faridabad where he was awarded the Gold Medal for securing the first position in the Course. He also won the first prize in the Indian Navy's prestigious Commodore Nott Essay Competition in 2017, which is held in open format across the Navy.

About the Paper

The paper is an attempt to examine the efficacy of the Logistics systems in place in the Defence Forces from an economic feasibility point of view. It examines the trend of Logistics related revenue expenditure (other than P&A) of the three services from 1995 onwards for two decades and calculates the year on year growth rates and other statistics to ascertain the feasibility of sustaining this trend of expenditure in the overall context of availability of National economic resources. The paper then examines models of Defence Logistics in countries like USA and UK and suggests recommendations on the basis of a unified approach towards Defence Logistics. The recommendations are based on identification of commonalities in material and functions and rationalising of manpower and organisations. A tentative organisation at the level of Service HQs is discussed along with discussion on consolidation of various departments in the Ministry of Defence achieving a more efficient system of dealing with Defence logistics in the country.

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an independent Think Tank dealing with contemporary issues of national security and conceptual aspects of land warfare, including conventional & sub-conventional conflicts and terrorism. CLAWS conducts research that is futuristic in outlook and policy oriented in approach.

CLAWS Vision: To establish CLAWS as a leading Think Tank in policy formulation on Land Warfare, National Security and Strategic Issues.

Website: www.claws.in Contact us: landwarfare@gmail.com