Chapter - 6

FINDINGS,
RECOMMENDATIONS
AND CONCLUSION
6.1. FINDINGS

MANUFACTURERS

**Ammunition Factory**: About 65.44% of the respondents give favourable response about supply chain management of ammunition factory, in this case the responses of respondents about cost reduction, feedback, R&D, flexibility, transportation, control, efficiency, modern technology and other parameters of the ammunition is positive but 10.77% respondents is neutral or have no responses about these parameters due to some biasness or other factors and the responses of 23.79% of the respondents give unfavourable response.

**Clothing**: The responses of the production house of clothing and GS is very positive or favourable on different parameters like cost reduction, flexibility, effectiveness, IT, supply relation management supply chain strategy, facility, efficacy of logistics, interface with end users and flexibility in distribution network. All these parameters show the efficiency and effectiveness of Indian army infantry. If we go through the data of respondents, about 70.32% respondents give favourable responses for production houses of Indian army for clothing and G.S. but every coin has two aspects same as here. Some of the respondents give unfavourable responses also.

**Electronic Equipment**: This section of the respondents which do not have normal characteristics require special treatment or in other words we can say that, there is a balance responses of respondents about the electronic equipment factory of Indian army infantry. Here the researcher observes that 54.36% of the respondents give positive response on the basis of difficult parameters which is used by the researcher for observing. The efficiency of the electronic equipment factory and the parameters which is used by the researchers is about R&D, flexibility, sourcing, facility, control and others about 29.43% of respondents gives fluctuating responses and 16.21% of respondents are neutral in this case.

**Weapons**: The responses of the respondents about the weapon factory of Indian army infantry is very balanced which shows the effectiveness of the weapon factory and their suppliers to Indian army infantry. Here the respondents give favourable responses about the different parameters which shows the flexibility, sourcing, transportation, cost reduction, IT and more other
parameters about 62.90% of the respondents favors effectiveness of weapon factory and 19.88% of
the respondents also agreed about the efficiency of the weapon factory of the Indian army but there
we can say that the supply chain management of Indian army is too efficient and effective.

**Public Sector Undertaking:** Civil defense suppliers of Indian army infantry play vital role. Here
researcher found that most of the respondents were NEUTRAL about their responses or become
neutral about the civil defense suppliers. So, this part does not have accurate facts. About 35.14%
of respondents give neutral response about civil defense suppliers and 6.32% of the respondents
disagreed in this situation. This is due to the critical or difficult supplying procedure of Indian army
infantry but most of the respondents give favourable responses, about 58.54% of the respondents
give positive response which shows the effectiveness of the civil defense suppliers.

**USERS**

On the basis of responses provided by various groups of the respondents, the following
important features about consumers/infantry battalion have come to a floor which can be taken
into consideration while deciding further course of action.

About 63.06% of the respondents or users favor the different parameter of the infantry battalion
and 22.34% of the respondents have disagreed. This is due to the thinking level of various
service groups and their knowledge about the efficiency and effectiveness of the Indian army
Infantry and about 14.60% of the respondents are neutral in this case.

Now the data which is shown on the basis of the various groups of the users are as follows:-

(a) **Consumers/Infantry Battalion (below 8 year service experience):** The responses of
the respondents below 8 years of their services about 54.64% of the respondents favours
or give positive response and 20.22% of the respondents is neutral in this case and 25.14%
of the respondents disagreed about the effectiveness, flexibility and other parameters of
the infantry battalion.

(b) **Consumer/infantry battalion (8 to 16 year service experience):** Approximately 61.51% of
the respondents give favourable responses about the supply relation management,
effectively, flexibility and other parameters of the infantry battalion 22.77% of the respondents were disagreed and 15.72% of the respondents were neutral about the parameters of the infantry battalion.

(c) **Consumers/Infantry battalion (above 16 year service experience):** On the issue the researcher have observed that 64.67% of the respondent give favourable response about the predefined parameters of the infantry battalion and about 21.85% of the respondents give unfavourable responses or disagreed and 13.48% of the respondents were neutral in this case. This is due to the some biasness and on the basis of experiences.

**WAREHOUSES**

Warehouse was divided into two types:-

(a) Forward Area Warehouse
(b) Rear Area Warehouse

(a) **Forward Area Warehouse:** 64.22% of the respondents give positive responses on different parameters which are efficiency, IT, Satisfaction, facility, flexibility and others and 16.22% of the respondents are neutral and 19.56% of the respondents are disagreed on different parameters on battalion stores.

- **Below 8 years:** Approximately 57.59% of the respondents below 8 years of forward area of warehousing give unfavourable responses and 48.16% of the respondents are neutral on this case. This shows the biasness of the responses.

- **Between 8 to 16 years:** 61.77% of the respondents give favourable responses on the different parameters of the forward area warehouse and about 17.59% of the people discarded this issue and 20.65% of the respondents are neutral in this issue.

- **Above 16 years:** If we talk about the respondents above 16 years and responses than about 62% of the respondent favours the parameters of the forward area warehousing and others are neutral for that particular parameters.
(b) **Rear area warehouse:** In rear area warehouse following were studied:-

B.1 Accessories of B-Vehicle  
B.2 Ammunition  
B.3 B-Vehicle  
B.4 Clothing  
B.5 Electronics  
B.6 Fire Fighting Equipment and MT Spares  
B.7 Fuel, Oil and Lubricants, Medicines, Paint and Varnish, Supply Depot, Tyre, Tubes and NBC, Weapons and Armaments

The findings for the above are listed as below:-

**B.1. Accessories of B vehicle warehouse:** About 48.88% of the respondents are neutral about the parameters of the accessories of B vehicle warehouse and rest of the respondents give favourable responses about the different parameters of the rare area warehousing.

- **Below 8 years:** Approximately 94.06% of the respondents give favourable feedback about the rare area warehousing of below 8 years and rest of the respondents are disagreed.

- **Between 8 to 16 years:** Approximately 90.51% of the respondents are neutral about all the parameters of the rare area warehousing means they are neutral about that particular system.

- **Above 16 years:** Approximately 93.56% of the respondents give favourable feedback and rare area warehousing and rest of the respondents are not aware about the facts of the rare ware housing that is why their responses were neutral.

**B.2. Ammunition:** If we talk about the warehouse of ammunition in Indian army infantry then 82.99% of the respondents give favourable responses about different parameters due to the efficiency and effectiveness of ammunition warehousing. 12.07% of the respondents are neutral in this case and only 4.95% of the respondents are disagreed about the efficiency of ammunition warehouse.
• **Below 8 years:** If we talk about ammunition warehousing below 8 years then about 81% of the respondents give favourable responses and 12.1% of the respondents are neutral and rest of the respondents are disagreed.

• **Between 8 to 16 years:** About 88.14% of respondents give favourable responses on given parameter's or factors o the ammunition warehousing and 11.86% people are neutral in this case.

• **Above 16 years:** Same in the case of above 16 year ammunition warehousing , most of the respondents give favourable response only few percent of people give unfavourable response and this is due to the lack of knowledge and due to biasness.

**B.3. B-Vehicles:** Approximately 63.08% of the respondents give favourable responses about the B-VEH warehouse and its parameter like efficiency, IT, supply relation management, flexibility and other factors. About 17.28% respondents are neutral in this case and 18.64% of the respondents are disagreed on B-VEH warehousing.

**B.4. Clothing:** Approximately 7.75% of the respondents disagreed and 12.69% of the respondents are neutral for clothing warehousing. But 79.57% of the respondents give favourable responses about the different parameters of the clothing warehouse which is transportation, HR, use of modern technology and so other factors which shows the efficiency and effectiveness of clothing warehouse.

**B.5. Electronics:** About 43.61% of the respondents give positive response about the electronic warehousing and its different parameters like safety, decision making, efficiency, transportation, IT and others. And about 28.88% of people give neutral response and 27.50% of respondents give unfavourable responses about the electronic warehousing.

**B.6. Fire Fighting Equipment and MT Spares:** 84.34% respondents give positive response about firefighting equipment and MT spare warehousing and their factors and parameter's and 10.75% respondents are neutral in this case, just because of lack of proper knowledge and biasness and 4.91% of the respondents give unfavourable response and disagreed about firefighting equipment and MT spares.
B.7. Miscellaneous Parameters: Fuel, Oil and Lubricants, Medicines, Paint and Varnish,
Supply Depot, Tyre, Tubes and NBC, Weapons and Armaments: If we talk about the
fuel, oil, lubricants, medicine, paints and varnish, supply depot, tyre tubes and NBC, weapons
and armaments warehouse and there parameter's and factors like transportation, IT, customer
satisfaction, flexibility and others then most of the respondents give positive feedback just
because of the efficiency and effectiveness of the warehouses. Only few parts of the
respondents are neutral and disagreed due to the biasness and lack of proper arrangement or
information about the related parameter's and factors.

6.2. WEAKNESSES OBSERVED

Weaknesses and Bottlenecks: One of the most important aspect as the student of Supply Chain
Management is to identify weaknesses and bottlenecks in the given supply chain and
recommend alternate solutions for the same. These aspects, particularly how they impinge in
Infantry is covered in succeeding paragraphs:-

Infantry Weapons: The major weaknesses in the administrative and operational logistic supply
chain are:-

(a) Lack of adequate technology infusion in Ordinance Factory Board (OFB). Bureaucratic
hurdles and lack of competition from private industries discourages OFB to go in even
for joint ventures.

(b) India's traditional lack of technical prowess in metallurgy. INSAS weapons suffer from
poor quality assurance and frequent defects.

(c) Lack of vision and long term planning shown by the fact, that the substitute weapon for
replacing 9 mm Carbine which was to declared obsolete 5 yrs back has still not reached
units.

(d) Release of weapons to units takes place based on four monthly census report compiled at
Division and higher level, is un-responsive to user satisfaction.
Cumbersome back loading procedure and then receipt voucher confirmation results in delayed reflection of deficiency of weapons by units.

**Vehicles:** Indian market is flooded with both indigenous and foreign heavy and light vehicles. The penetration of these vehicles in the Indian Army is restricted to few companies with limited models. The major flaws are as under:

(a) No substitute selected for last 10 years, for one Ton vehicle. One Tone vehicle with seating capacity of a section is ideal for fighting echelon vehicles and in CI/CT operations.

(b) HMVs sourced from BEML suffer from frequent product and spare delays thus non availability at user end.

(c) Spurious and fake spares flood the market thus adversely affecting MTBF.

(d) Release of vehicles and back loading suffer from long drawn procedures and bureaucratic hurdles.

**General Stores and Clothing:** India is an exporter of pre-stitched readymade apparels of all sizes, yet we are unable to provide standard sized uniform to all our soldiers. The weaknesses of supply chain of general and clothing stores are:

(a) Variety proliferation of equipment including various types of uniforms.

(b) Over dependence of SSI and government patronage.

(c) Failure of Indian market to indigenize ECC & equipment.

(d) Unrealistic price fixation to procure quality products at local levels.

**Ammunition:** Supply chain of ammunition suffers from following blockages:

(a) Poor quality management in OFB thus resulting in loss of life and equipment in ranges.

(b) Slippages in production targets thus depriving soldiers' right to training due to restriction lists and low All India Availability (AIA).

(c) Time consuming defect investigation procedure resulting in ammunition remaining segregated for protracted periods.
(d) Poor storage facility at both supply and user end resulting in quality deterioration and deviation sanctions.

(e) Uncoordinated obsolescence between weapon and ammunition. E.g. Production of 9 mm ball ammunition has been stopped but weapons are still in inventory.

Rations: The weakness of supply chain of rations is as under:-

(a) Procurement of rice for troops is from FCI which gets procured from farmers in the last year. Inadequate storage facility at FCI, cooperatives, supply depots and end users leads to deterioration in quality.

(b) Stocking policy envisages large reserves thus demanding turnover of stocks. Hence some items get issued to troops closer to ESL.

(c) Lack of Infrastructure to include cold supply chain, refrigerated lorries and pest control measures lead to quality deterioration of fresh and milk products.

(d) Archaic system of procurement through L-1 vendors does not assure proper quality products to users.

6.3 RECOMMENDATIONS

The following are recommended at macro level:-

(a) Privatization of OFB is necessary, however, if complete privatization is not considered feasible in short term then technical alliance with private partners for technology infusion.

(b) Holistic approach in obsolescence of weapon and its ammunition.

(c) Long term planning and provisioning to include known wastages of arms, ammunition and vehicles.

(d) Long term contracts with industry to include after sales service and original spares for vehicles.

(e) Technology infusion in OFB to improve quality.
(f) Jt production of ammunition with friendly foreign countries to enhance AIA and improve quality.

(g) Contracts with large corporate like Reliance or Wal-Mart to supply fresh products in units in peace stations.

(h) Development of cold supply chain nationally and in the Army.

(j) Contract with large corporate house to procure pre stitched clothing.

The following issues merit attention at Ministry of Defence or Army HQ:-

(a) In house qualified defect investigation teams to cut down segregation time of ammunition.

(b) Improved infrastructure to include air conditioned warehousing for ammunition.

(c) Auto generation of demands on software which caters for restriction and availability of ammunition.

(d) Infrastructural development at supply depots to ensure adequate and safe stocking.

(e) Review of stocking policy to factor in improved road and rail connectivity.

(f) Review of vendor base to ensure broader participation in ration contracts.

(g) Option to claim money in lieu of rations to troops should be available.

(h) AWAN based automation of demand and release procedure thus doing away with the census reports for weapons and vehicles enhancing visibility of demand and availability.

(j) Enhanced financial powers to users to procure at local level.

(k) Cash in lieu to troops for ordnance items not issued to them or not available.

(l) In high altitude areas, to turn operational logistics system to push system, creation of adequate forward infrastructure required at infantry battalion level.

(m) Latest non-chemical based tinned and packaged varieties of fresh are included in high altitude rations.
6.4 CONCLUSIONS

Overall Conclusions drawn are as under: -

1. A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers and even customers themselves.

2. There are three logistical drivers and three cross functional drivers of Supply Chain Management. The logistical drivers are facilities, inventory and transportation. The cross functional drivers are information, sourcing and pricing that determine the performance of any supply chain. The role of each driver is to create strategic fit between the supply chain strategy and the competitive strategy which used in the design, planning and operation of supply chain.

3. It is very important to understand that these drivers do not act independently but interact with each other to determine the overall supply chain performance. Good supply chain design and operation recognizes this interaction and makes the requisite trade offers to deliver the desired level of responsiveness and an appropriate cost.

4. As the recent wars in the Gulf and Afghanistan have shown, it is imperative that victory is measured by the area occupied by the victor nation's troops. These are boots on ground. The function of Infantry is to capture and hold ground physically. Thus it is called the queen of the battle. In developing countries, the role and importance of Infantry is further enhanced due to limited air and artillery capacity. Thus it was imperative for the student of military art and science and management studies to gauge the impact of SCM on Infantry.

5. The researcher set out the objective of understanding inventory management to include procurement, warehousing, transportation, MHE's, outsourcing and tracking system in Infantry.

6. The research methodology employed was exploratory in nature. The sampling area was broadly divided into four sectors like ordnance factories, defense PSUs, R&D Organizations, warehousing units and user units i.e. Infantry.
7. User has a major stake in the supply chain management. If we examine the user and ordnance/ supply/ last warehousing interface, most of the respondents have given favourable response. 57% users prefer IT to enhance efficiency. The user also likes to have flexibility in provisioning, enhanced user-producer interface and improved R&D. There is desire amongst users to switch to enhanced efficiency and labor saving devices while dealing with forward area warehousing.

8. The study encompasses the responses of employees of ammunition factory, clothing and general stores production house, electronic equipment factory, civil defense suppliers and weapon factory. Most of the samples like enhanced R&D, innovation techniques, end user interface and enhanced user satisfaction.

9. The major weaknesses and further recommendations have been clearly enunciated in the study. All stake holders including Ministry of Defense, Army HQ Infantry Directorate, OFB, PSUs and intermediate warehousing units have a role to play in improving end user satisfaction of Infantry.

10. The researcher is grateful to the respondents from diverse backgrounds who gave their opinion on the topic affecting National security and well being affecting all citizens.

11. The problem of national security is also regarded as one big economic problem. Any nation has limited resources to satisfy competing objectives like economic growth, social security, hospitals, education and national security. So, there exists an urgent need to remove SCM bottlenecks and improve efficiency of the chain to provide enhanced end user satisfaction to Infantry in the interest of the Nation.

Indian Army is the last tool of the nation whether in war, counter terrorist operations or disaster relief missions. Infantry remains the queen of the battle or all other no war and no peace missions. Thus it is imperative that all these supply chain bottlenecks are addressed holistically to ensure Indian Army does not have to look over its shoulder in any task again. Infantry should be well equipped and fed to achieve success for the nation and its people.
6.5 LIMITATIONS

1. The study was related with supply chain management and was restricted to Infantry Branch of Indian Army only. Other branches of Indian Army were not considered in this study.

2. The sample selection and questionnaire parameter framing was done carefully to cover all aspects of supply chain management. However, there may be possibility for covering more aspects.

3. No information or data of classified nature have been attempted to either access or reproduce.

4. The study will be biased to Army inventory Management and will cover the aspects of industrial warehousing to a very limited detail.

5. It will have limited importance for profit earning organization in civil domain.

6. The confidentiality of Army's functional aspects would not be covered and the study will restrict its scope to material handling and tracking till unit HQ's only.

7. The study does not perform or focus on any type of comparison with International Army and its supply chain management.

6.6 FURTHER AREA OF RESEARCH

The researcher suggests the following further area for research in the field:

1. Infantry is very large component of the Indian Army. The troops are deployed in different kind of terrain and climatic conditions. That means troops deployed in High Altitude Areas in our Northern & North Eastern region will have different requirement of weapons, ammunition, equipment, clothing, vehicles, medicines, etc then those deployed in the Desert and other plain areas of our Western region. Thus, there will be a necessity to undertake a specific region based or focused research on Supply Chain Management so as to arrive at terrain or climatic specific problem areas and recommendations. Therefore, such a study could be initiated by each geographical command of the Indian Army and then
facts collaborated at the level of the Ministry of Defence through the Army HQ. Towards that, this study can be treated as a path breaking research work.

2. Other departments / branches of Indian Army can be taken up for study of supply chain management.

3. Comparative study between different branches of Indian Army can be taken up.

4. A detailed study of the Supply Chain Management as practiced in other leading Armies of the world can be undertaken, duly drawing out the comparison with own.

5. Research inputs from this study can be applied or studied with due care and precautions in private sector organizations.