ANALYSIS OF FACTORS INFLUENCING THE EFFICIENT AND EFFECTIVE SUPPLY OF UNIFORM MATERIAL: CASE OF A PUBLIC SECTOR ORGANISATION

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Dissertation submitted in partial fulfillment of the requirements for the MBA in Supply Chain Management

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April 2019

Student Declaration

The work described in this research was carried out by me under the supervision of (Mrs.) Harshani Liyanage and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree or Diploma.

PAP PRIYADARSHANA

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ABSTRACT

The main objective of this thesis is to **analyze the factors influencing the effective and efficient supply of uniform material: case of a public sector organization.** Since 2005, DTAC, the Cabinet Appointed Procurement Committee has allocated uniform materials requirements of the state sector to local textile manufacturers. The main objective of this exercise is to empower the Local Textile Manufacturers. However, researcher observed that, there is huge lead time gap when material supplying through DTAC. Pre-processing lead of DTAC purchasing process is very high comparatively to the government procurement process. Public sector organizations have to provide textile material to run their own garment factories situated at their premises and unavailability of material make machine idling situation. Because, this garment factories establish to provide stitching facility only for uniform requirement of military personnel's and they do not accept any outside orders like in a privet sector garment factory. Collection of data, both preliminary and secondary was based on the factors contributing to the efficient and effective uniform material supply by Local Textile Manufacturers through the policy adopted by the government. These factors are identified as variables. Accordingly, six variables have been selected and to measure those variables researcher has selected several indicators as appropriate. Those six variables are co0lloboration among stakeholders, development of production capacity of the manufacturers, improvement of quality of the fabrics, extent of using modern technologies, the incentives granted by the government and item acceptance.

In view of collecting data, two type of questionnaire were prepared and questionnaire no 2 was distributed among four major factories and held interviews with factory owners and other officials who involved in the scheme. The questioner no 1 was distributed among the personnel who are directly involving with this purchasing process to see the impact of each variable on lead time. To study the production process researcher visited the factories and obtained further details for strengthening the reliability of the data. The study more focused on purchase of uniform materials to the SLAF because the time and recourses available are very limited and finding and recommendation of this case study can be applying for other sister services too.

A survey research was carried out using structured questionnaire collecting data from a sample of 32 (n=32) respondent in DTAC supply chain. Survey data collected are first used to validate the measurement properties and then hypotheses were tested. A significant relationship between factors influencing for efficient and effective supply of uniform material to public sector was observed. Further, this study reveals a moderate level of GSCM adaptation in Sri Lankan manufacturing firms. Thus, the results of this study support the view that influencing factors like collaboration do influence the performance of firms, ensuring growth and survival, regardless of the size of the firm. The key findings were compared with prevailing literature based on developed and developing countries and recommendation was given as to how this problem can minimized and what practices can be adapted by manufacturing firms in future for better performance of uniform material manufacturing process, which would lead to yield competitive advantages stakeholders in DTAC supply chain. With an in-depth investigation it was found that the Domestic textile industry can be brought on top winning track if government and other individuals take serious actions in removing or normalizing the hurdles behind this complicated process. Additionally, the government should provide subsidy to the textile industry, minimize the internal dispute among the manufactures, withdraw the withholding and sales taxes etc. Purchasing new machinery or enhancing the quality of the existing machinery and introducing new technology can also be very useful in increasing the research and development (R and D) related activities that in the modern era are very important for increasing the domestic textile sector growth of a country.

Key words - Collaboration, Higher-level Supervision, Technology, Performance, Quality, Technology, Public sector, Efficiency, effectiveness, Integration

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LIST OF ABBREVIATIONS

Abbreviation	Description
NCC	-National Cadet Corps
DTAC	-Domestic Textile Allocation Committee
STF	-Special Task Force
SLAF	-Sri Lanka Air Force
CAPC	-Cabinet Appointed Procurement Committee
R&D	-Receipt & Dispatching
SLITA	-Sri Lanka Institute of Textile & Apparel
TEC	-Technical evaluation Committee
VFM	-Value for Money
PPA	-Public procurement Act
CEO	-Chaff Equipment Officer
MIC	-Ministry of Industry and
ERP	-Enterprise Research Planning
PWP	-Plant within a Plant
ITI	- industrial technology Institute
SLSI	- Sri Lanka Standard Institute
ASN	-Advance Shipping Notice
SMD	-Supply and Maintenance Depot
RFID	-Radio Frequency Identification
SLS	-Sri Lanka Standards
BOC	-Brought on Charge.
ICB	-International Competitive Bidding
NCB	-National Competitive Bidding
LIB	-Limited International Bidding (LIB)
LNB	-Limited National Bidding (LNB)
DC	-Direct Contracting (DC)
MFA	-Multi-fiber Arrangements

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CHAPTER I

1. INTRODUCTION

1.1. Background

The history of the domestic textile industry in Sri Lanka goes over 2500 years and connected with prince Vijayas arrival to the country. There were many ups and downs. Starting of Hewawitharana School in 1912 at Rajagiriya by Mudlier DC Hewawitharana can be taken as a first steps of the present development of the industry. During the British rule in 1920 weaving inspectors had been appointed and by 1945 there had been 198 demonstration centers, around 81 weaving schools and 55 handloom working place. 60's and 70's can be identified as a hay day of the handloom industry and then government has given proper encouragement and leadership to empower the local textile industry. This days the textile producers enjoyed a protected domestic market and the industrial product regulation act 1965 and foreign exchange regulation were supported to get this achievement and catering to the basic clothing and household clothing requirement of the country. According to the survey carried out by government officials the highest number of installed handlooms was recorded as 115000 in 1977 prior to the introduction of open economy concepts to Sri Lanka. During this period the domestic textile industry were clustered around the certain areas of the country mainly western, north western, central, southern and eastern provinces and per village there were at least one or two handloom factories. Domestic textile industry was faced with enormous difficulties with the induction of open economic policies in 1977. The life style of the people, Cultural changers and modernized clothing patterns and seepage from the garment industry created difficulties for the local manufactures who were producing conventional type of locally made products. With the result of this many traditional handloom units which producing conventional type textile were closed down their factories and those who manage to make changers themselves to face the emerging marketing trend were survived. Handloom industry became mass market to niche market product with this changers. Then governments has identified the assistance required by the domestic industry to face the impact of the newly introduced opened market and introduced many types of development program to keep domestic producers to being in

the industry and survives to a certain extent. Only the eastern province does not effected from open market impact as they enjoyed reasonable domestic market with the traditional product such as Sarongs and sarees they usually wishers to wear. However, they were also affected from the terrorism that prevailed in that area and later from the tsunami Disaster in end 2004.

However, government came into power in 2005 identified the importance of strengthen domestic textile industry. By analyzing the requirements and importance of uplifting domestic textile industry. Government did study on this sector and found that total estimated uniform material requirement of government institutions in 2005 is as 16Mn. meters where Ministry Of Education requirement was 9.3Mn. Meters and Armed Forces, Other Institutions 6.7Mn.meters. Ministry of Education has spent Rs.899Mn. for the purchase of 9.3Mn.meters of fabrics in 2005 and Rs. 1.26Bn.for the purchase of 10.475Mn.meters of fabrics in 2010.As per 2013 annual performance report, the Requirement of uniform material of the Army, Navy Air Force Forces, Department of Police, Special Task Force, Department of Civil Securities, Department of Prison and National Cadet Corps is 5,230,700 mtrs and Requirement of School Uniform materials 11,011,000 mtrs in year 2015. Before 2005 uniform materials were imported from other countries. This has resulted outflow of large amount of foreign exchange to other countries.

Considering the above facts government has decided to obtain requirement of uniform material to the public sector from Local Textile Manufacturers. Accordingly a new scheme has been introduced through 2005 budget proposals where all Government textile requirements of Armed forces, Department of Police, Department of Prisons and other Government Agencies including materials for school uniforms to be procured from local manufacturers. Accordingly, Public Finance Circular No.PF/416 dated 20 June 2005 has been issued by the Secretary to the Treasury instructing all Government Institutions to procure their uniform requirements from the Local Textile Manufacturers through the Domestic Textile Allocation Committee (DTAC) established under the Ministry of Industry and Investment Promotion. Government Institutions were allowed to purchase annual textile requirements up to a value of Rs.2Mn. in terms of Government Tender Procedures from the Local Manufacturers certified by the DTAC.

1.2. **Problem Statement**

As in the 2005 budget proposals, Government objective was to uplift the level of Local Textile Manufacturers which may result several advantageous to the country such as employment generation, utilization of available resources, developing capacity of the local manufacturers, introducing modern technologies and retaining foreign exchange within the country. However, after 14 years of starting this scheme neither government nor the Ministry of Industry& commerce, the implementing agency does not know whether the government objective is achieved. Whether the material supplies are on time as per the requirement or prices are reasonable or not.

Arm force in Sri Lanka are been playing major roll when Defense Security concerned. As public sector organizations, they continuously deal with DTAC procurement process to buy their uniform. The uniforms are concerned, the availability is a must. As well as providing of annual kit issue for servicemen and women is a task headed by the military logisticians? However, the annual kit issue for over three hundred thousand of entire Force can't be fulfilled at overnight and there should be a proper procurement plan and schedule. Accordingly, Logisticians have to plan their current year requirement at least one year prior to the actual requirement. Higher lead time due to administrative problems, production delays and delivery issues create stock outs. So, to face that challenging task, public sector organization had established their own Garment Factories. (As an example, SLAF has factories at Air Force Base Katunayaka, station Sigiriya and Base Higuraggoda.) To run this Garment factories, SLAF had been recruited well qualified skill laborers as a service members. All facilities were provided to maintained required production capacity to fulfill the annual kit issue requirement of SLAF personnel. So stitching of kitting, SLAF required material and same material should deliver to supply and maintenance deport at Katunayaka as per the scheduled prepared by Air Headquarters. Scheduled lead time is the most important aspect when inventory management concerned. If material not delivers within the given scheduled lead time, material cannot be issued for stitching requirement of garment factories. Then, machine idling situation will arise, daily production cannot be fulfilled and automatically stock out situations occurs. This is similar to when Army, Navy and Police is concerned.

To face stock out situations, public sector organization may have to follow the immediate buying process, not the material, it may be finished product such as trousers, shirts, overall and etc. To purchase finished garments through immediate buying process, public sector organization have to get special authority from respective ministries and have to pay more prices than normal buying. The quality of emergency buying is not in accepted level and cannot be more concerned on quality due to urgency of the requirement.

As per above said treasury seculars, Purchasing of uniform material required for stitching of annual kit issue items for public sector organizations to be done only through the Domestic Textile Allocation Committee. Researcher observed that, time consume to deliver uniform material by the domestic suppliers when material purchase through DTAC is very much higher than the normal government Procurement process. Even the DTAC process has higher scheduled lead time textile manufacturers are not in a position to deliver the material as the public sector required and they takes some more days to complete the delivery. To face this situation public sector organization have to find out alternatives and basically what they do is purchasing of additional stocks and keep them as a buffer stock to used when materials not delivered as per the scheduled. This situation became as a major problem when inventory management concerned of public sector organizations is concerned. In the same time, the Public sector organization does not have sufficient warehousing facility to store material requirement of forthcoming two years.

If the public sector is concerned, to run their own garment factories without machine idling situation and to provide annual kit issue as per the Scheduled without stock out situation, The organization like Army ,Navy, and Air Force have to purchase and store material as a bulk. Maintaining of bulk material required for forthcoming years at available limited warehouse facility is limiting for storing of current year essential requirement. Therefore, the logisticians have to find the required warehouse facilities and to give more concentration for warehousing than the primary task allocated for them.

Unavailability of material at main warehouse creates situations to purchase uniform from open market, mostly import and supply basis. The result of immediate purchasing practices will directly effect for country economy and balance of payment too. In the same time, the domestic manufactures is concerned, they may lost their market share and factories have to face idling situation without having required orders to run the factory throughout the year.

As per government rule, whether public sector organization likes or not they have to purchase their uniform material requirement through DTAC. So, **factors effecting for efficient and effective material supply to be identified to make proper solution for this problem.** Therefore, researcher takes many attempts to find the real reasons for this issue and enhance the efficiency and effectiveness of material supply to public sector organizations through DTAC and the study is focused "to address reasons, why domestic textile manufactures fails to deliver uniform materials on time and factors influencing for efficient and effective floor of material to public sector " .

1.3. Significance of the Study

Sri Lanka has been showing negative trade balance as the import expenditure is more than the export income. To position the country in a favorably situation it has to curtail imports and increase exports. Another option is to make value addition to the exports and imports. Local Manufactures can produced goods by using imported raw materials with some value addition and some goods can be imported and convert into finished products by way of value addition. Sri Lanka as a developing country more focuses on it is industrial development and grants several incentives to the various sectors. To develop the Textile Sector a policy decision was taken to obtain uniform materials required for the public Sector from Local Textile Manufacturers by spending an additional amount over the imported material. By launching this scheme the local textile industry could develop and prevent foreign exchange flow out of the country. The value addition to the fabric either from yarn to finished fabric or from grey to finished fabric is considered to be real wealth to the country. Researcher strictly believes that, purchase of all type of uniform material from domestic manufactures is benefited to

strengthen country economy and minimized the balance of payment. However, researcher observed some factors influencing for efficient and effective material supply to public sector organization through Domestic Textile Allocation Committee (DTAC). However, Compared to SLAF procurement process the lead time of recommended process is very high and due to that, public sector organizations are facing many difficulties. The study may reveal the reasons for inefficient and ineffective material supply when purchasing the material from Local Textile Manufactures through DTAC. The result of the study could help policy makers for taking decision on textile industry. Respective users can enhance their capabilities and provide annual kit issues on time. It may also help the sustainability of the scheme. Also the study can identify weaknesses and strengths of the DTAC purchasing process and there by authorities can take immediate action to empower the industry and enhance the efficiency and effectiveness of material supply in the process.

1.4. **Major Research Question**

Since 2005, DTAC, the Cabinet Appointed Procurement Committee has allocated uniform materials requirements of the public sector to local textile manufacturers. The main objective of this exercise is to empower the Local Textile Manufacturers. In this scheme government expected that the Local Textile Manufacturers would improve their capacity gradually to enable the government to obtain total uniform material requirement from the Local Textile Manufacturers. Domestic textile manufactures concerned, they are capable enough to provide total uniformed material requirement of public sector organization including school uniform. However, researcher observed that, there is huge lead time gap and inefficient and ineffective processes when material supplying through DTAC. Pre-processing lead time of DTAC purchasing process is very high comparatively to the government procurement process. When the task allocated for the military logisticians is concerned, failure to provide annual kit issue for the force without justifiable reason is a punishable offence and neglecting of primary responsibility of Logistic Branch. During the study, researcher observed that domestic suppliers have not been delivering uniformed material on time as per contract agreement or scheduled date given for them by the public sector

organization. Most of the year's DTAC suppliers fails to deliver current year requirements within that particular year. Researcher identified thirteen steps in DTAC purchasing process. To complete each steps it takes number of days. Sometime it is below the scheduled date given and most of the time above the given scheduled. The study may reveal the factors influencing for efficient and effective material supply to the public sector organization through the Local Textile Manufactures registered under DTAC. Therefore, the main research question would be **"Is it the supply of uniform material through Domestic Textile Allocation Committee (DTAC) to public sector organizations efficient and effective?**

1.5. Overall Objective

The overall objective of the research study is to invite the reasons why Local Textile Manufacturers fails to deliver the textile material efficient and effective manner when government policy of purchasing uniform material requirements from the Local Textile Manufacturers through the DTAC and to avoid Stock out situations at main warehouses of public sector organization to provide annual kit issue requirement of serving personnel.

1.6. Specific objectives

The specific objectives of the research are as follows.

a. To understand why the DTAC suppliers fails to provide of uniform material as per scheduled date.

b. To investigate a method to reduce lead time.

1.7. **Hypothesis of the study**

H1: Collaboration among the stakeholders in supply chain is positively related to Efficient and Effective material supply through DTAC

$H0_i$: No relationship between Collaboration among the stakeholders in supply chain and Efficient and Effective material supply through DTAC

H2: Further expansion of production capacity, Processing/Production infrastructure is necessary to enhance the Efficient and Effective material supply through DTAC

$H0_i$: Further expansion of production capacity, Processing/Production infrastructure is not necessary to enhance the Efficient and Effective material supply through DTAC

H3: Expenses related to Quality improvement is positively related to Efficient and Effective material supply through DTAC

HO_i: There is no relationship between further Quality improvement and Efficient and Effective material supply through DTAC

H4: There is a relationship between technology and Efficient and Effective material supply through DTAC

$H0_i$: There is no association of latest technology and Efficient and Effective material

H5: Textile sector growth and efficient and effective supply to public sector is dependent on Government activities.

$H0_i$: The government activities are negatively influence for Domestic textile sector Growth.

H6: There is strong relationship of acceptance, competency and skilled human resource on textile sector growth and efficient and effective supply

$H0_i$: Quick acceptance, competency and skilled human resource have no impact on textile sector growth and efficient and effective supply

1.8. **Research Methodology**

This Study applies a mix methodology to eliminate weaknesses of both qualitative and quantitative data in the research. This is basically survey base case study and the popular non probability sampling technique call **purposive sampling method** used to collect the data from a specific target group relevant to current study area. Researcher used **Judgments sampling technique** comes under purposive sampling method to collect the information from most advantageous and specific target group such as SLITA, DTAC, TEC, Domestic textile Manufactures, SLAF and other public sector organizations. The Current study is focus to specific area and only some people knowing the intended information relevant to each step in DTAC purchasing process. That was the reason why the researcher uses judgment sampling technique to collect the data from most advantageous people and places. The selection criteria were based on the number of officials engaging with the existing process and 35 respondents were selected as a sample. A number above 30, according to sekaran. (2003) is acceptable. This study, domestic textile industry is mainly divided in to two specific area call weaving and grey processing. So, when selecting samples, researcher used **quota sampling technique** also to make sure that weaving and grey processing manufactures as well as the all stakeholders in the process are adequately represented.

Due to resource constraints, proposed survey was limited to four factories where two factories from weave and process category and the other two factories from grey fabric import and process category. The purpose of this sample was to employ a case study to observe effectiveness of the entire scheme launched by the government. Primary data were collected by means of conducting interviews and administering questionnaires. Secondary data was collected from Ministry of Industry and commerce, purchasing institutions and suppliers. Those data will be analyzed qualitatively as well as the quantitatively.

In the literature review researcher go through entire purchasing process to find the reasons for this inefficient and ineffective material supply to public sector organization and one reason was found as long lead time. Depth study was carried out

with selected factories with a view to see how far public sector organization can minimize the lead time and plan the efficient and effective receipt of items within the delivery period mentioned in the contract agreement.

In addition to that, researcher used likert five point rating scale of 1,2,3,4 and 5 to analyze respondent in the questionnaire. The Questionnaire was circulated among the sample selected under judgmental sample selection method. The collected were edited for accuracy, uniformity, consistency and completeness and then arrange to enable cording and tabulation before final analysis using IBM SPSS software. To test the reliability of the questioner Cronbach's alpha value was obtained and Kline (1999) noted that although the generally accepted value of 0.8 is appropriate for cognitive tests such as intelligent tests , for reliability tests a cut-off point of 0.7 if more suitable. He goes onto say that when dealing with psychological construct values bellow even 0.7can, realistically, is expected because of the diversity of the constructs being measured. Descriptive statistics, correlation coefficient and multiple regressions were used to verify results and arrive at certain conclusions to see the relationship and appropriate statistical manipulations have done for hypotheses testing.

1.9. **Scope and Limitations**

The study is focused to explore the reality of the material purchase through DTAC to public sector of Sri Lanka. This study will give a clear indication of the necessity of policy, guideline and framework for procurement from DTAC. This study will also identify the drawback and limitation of existing DTAC process and will suggest necessary corrections to overcome the problem.

The entire supply chain of this scheme covers vast area which includes purchase of uniform materials to Schools, Dhamma Schools. Armed forces, Police, Prison STF, Civil Security and Cadet Corp. These purchasing institutions purchase deferent type of uniform materials with different quantities. Analyzing of each and every supply for each and every organization may complicate the study. Therefore, when deep analysis comes, researcher limited to uniform material supplies to Sri Lanka Air Force through DTAC supply chain since 2015 to 2018. However more detail of entire system will be discussed

in the literature review. Accordingly uniform materials such as camouflage uniform, T-shirt material, PT short material, overall material, trouser material, shocks, towel, bed sheets and etc. Were taken into consideration.

There are some limitations and constraints on the way of doing this research work. In our country, there are not much research works relating to DTAC procurement. The study was based on both primary and secondary data. Scarcity of related academic materials and studies on the subject area in the Sri Lankan context was also a major constraint.

1.10. **Summary**

The whole research work is presented in five different chapters. The first chapter is the introduction chapter; which gives an outline of the general background of the DTAC Purchasing process when material purchasing to the public sector of Sri Lanka. This chapter also explains the overall objective of the work, research question, research hypothesis and scope and limitation. The second chapter is the literature review chapter; Literature review related to Procurement Cycle, Value For Money in public procurement, time and cost overruns, efficiency and effectiveness, causes contributing to time variance. The third chapter is the research methodology of this thesis; the main topics included in this chapter are data sources, sample design, questionnaire design, questionnaire content, pilot study data collection, data analysis and report writing. The fourth chapter is comparison of different data analysis, procurement procedure. The fifth chapter is the Results and discussion, conclusions and recommendations chapter.

CHAPTER 2

2. LITERATURE REVIEW

2.1. Introduction

This chapter provides the literature review of the survey. The literature review provides theoretical background to the study. Researcher reviewed the literature in order to acquaint the available body of knowledge in the area of study. The literature review has greatly helped the researcher to bring clarity and focus to the research problem, improve the research methodology, broaden the knowledge base in the research area and conceptualize the findings. Accordingly researcher tried to present most appropriate findings in this text.

2.1.1. Public sector and the Public sector procurement

Farrington (2006) defines procurement as a process of obtaining goods or services in any way including borrowing, leasing, and even force or pillage. This process is widely covered in the tendering process that entirely entails a number of procedures to be followed. A tender or bid is a formal offer to supply goods or services for an agreed price (Harrington, 2006).

Public procurement has been defined as acquisition for public consumption (Weiss, 1993). It is through public procurement that the State, or its territorial or functional subdivisions, undertakes public works, builds roads and cares for health, education and public order. Since World War One the importance of this function has gradually increased as the relative size of the government sector as a percentage of gross national product has increased. More recently international negotiation and agreements on public procurement (e.g. European Procurement Directives and the Government Procurement Agreement of the World Trade Organization) have brought a renewed focus on procurement issues.

When the public sector procurement is concerned Value for Money (VFM) in the public procurement is very much important. Achieving Value for Money (VFM) is important

for any Public Procurement. In the “Construction Procurement Manual” of the Scottish Government Publication, the prime objective of public procurement is defined as to achieve VFM - the optimum combination of whole life cost and quality to meet the customer's requirement. VFM does not necessarily mean accepting the lowest bid; rather quality, as well as price, must be considered when appointing consultants and contractors. The greatest opportunity for achieving VFM occurs at project inception. Correct project definition is essential to meet the users' needs while achieving VFM. VFM is more than the lowest cost. VFM increased benefits to the end users of a service, greater certainty of the financial outcome due to less exposure to risk and the delivery of a service at a specified level for a lower cost. Researcher believing that one of reason for introducing this to over country is benefit of VFM.

Investor words, (3947). Public sector is the part of the economy concerned with providing basic government services. The composition of the public sector varies by country, but in most countries the public sector includes such services as the **police, military**, public roads, public transit, **primary education** and **healthcare** for the poor. The public sector might provide services that non-payer cannot be excluded from (such as street lighting), services which benefit all of society rather than just the individual who uses the service (such as public education), and services that encourage equal opportunity.

Bailey et al, (2008) define procurement as that function dealing with buying materials of the right quality, at the right price, time and the right source of supply. Bally (1999) argues that, the Procurement process is composed of several elements, namely: deciding what to purchase, deciding who to purchase from, negotiating an exchange rate and exchanging resources for goods or services.

Morris (2003) define procurement as the complete action or process of acquiring or obtaining personnel material, services or property from outside a military service by means authorized in pertinent directives. This is procurement is more specifically the action or process of acquiring or obtaining materials, property or services at the operational level.

Public procurement Act (PPA No. 21 of 2004) section 3 “procurement” means buying, purchasing, renting, leasing or otherwise acquiring any goods, works or services by a procuring entity spending public funds on behalf of a ministry, department or regional administration of the Government or public body and includes all functions that pertain to the obtaining of any goods, works or services, including description of requirements, selection and invitation of tenderers, preparation and award of contracts.

Pienaar (2005) argued that; “Every business enterprise purchases its materials, services and assets such as Machinery and equipment, Motor vehicles, Furniture and Fittings from other Firms. These materials, services and assets are used in the production, marketing, logistics and other operations of the enterprises”. The process of purchasing these items is known as procurement. According to Farmer and Weele (1995), “Procurement is a broader term, which includes all activities required in order to obtain the product from the supplier and get it to the place where it actually used. It encompasses the purchasing function, stores, traffic and transportation, incoming inspection, and quality control and assurance”.

A **military** or an **armed force** is a professional organization formally authorized by a sovereign state to use lethal or deadly force and weapons to support the interests of the state. It typically consists of branches such as an Army, Navy, Air Force, and in certain countries the Marines and Coast Guard.

In Sri Lankan context, when purchasing of textile and apparel to public sector organization, they have to follow the DTAC procedure.

According to the *Ministry of Industrial Development. Textile Statistic of Sri Lanka. G*overnment established a committee called **"Domestic Textile Allocation Committee" (DTAC)** which is a Cabinet Appointed Procurement Committee (CAPC) under the Chairmanship of the Secretary Ministry of Industry and Investment promotion. In this regard, Minister of Industry and Investment Promotion has submitted a cabinet memorandum dated 29.03.2005 seeking approval of the Cabinet of Ministers to implement the programme. The DTAC procedure is attached as Appendix - A

2.1.2. The DTAC supply chain

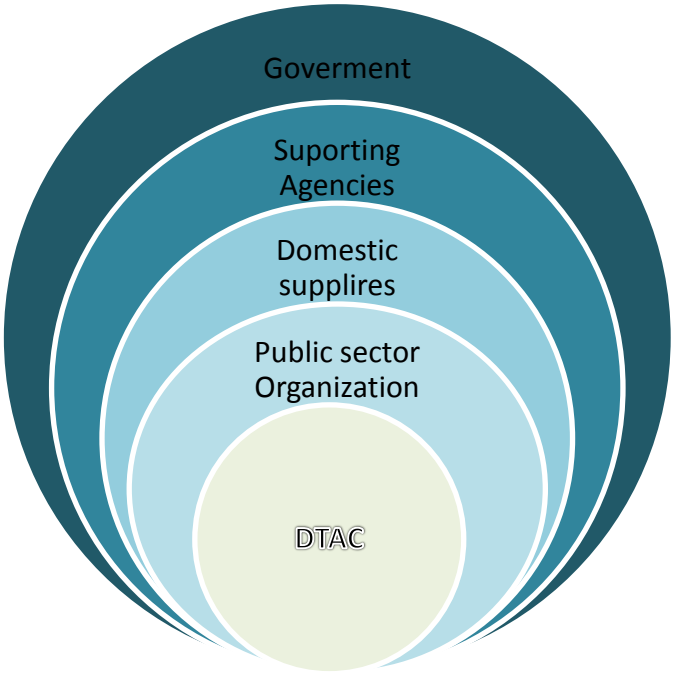

Figure 2-1 DTAC supply chain

Supply chain management is recognized as an important area for information technology innovation and investment (Bowersox and Daugherty, 1995). Supply chain management has been defined by The Global Supply Chain Forum as ‘‘the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders’’ (Lambert et al., 1998, p. 1). With implementation of supply chain management, the narrow focus of managers and the adversarial relationships between logistics providers, suppliers, and customers are replaced with strategic alliances and long-term cooperative relationships and viewing suppliers and customers as partners instead of adversaries (Tan et al., 1998) with the objective of ‘‘maximiz(ing) competitiveness and profitability for the company as well as the whole supply chain network including the end-customer’’ (Lambert et al., 1998, p. 4). Better information exchange between supply chain partners, perhaps the key advantage of an integrated supply chain (Lee et al., 1997; Levary, 2000), provides more up-to-date information and allows for more accurate inventory responses to changes in demand and thus 96 K.A. Patterson et al. / Transportation Research Part E 39 (2003) 95–121 more appropriate inventory levels throughout the supply chain (Levary, 2000; Stank

et al., 1999). Levary (2000, pp. 25–26) suggests the benefits of supply chain integration include

a. Minimize the bullwhip effect
b. Maximizing the efficiency of conducting activities along the supply chain
c. Minimized the inventories along the supply chain
d. Minimized cycle times along the supply chain
e. Achieving an acceptable level of quality along the supply chain

2.2. Collaboration among the stakeholders in supply chain

Business management has entered the era of networking competition which moves the competition from local to global business environment and from company against company to that of supply chain against another supply chain. Currently, competition is not measured only by individual company performance but also in terms of supply chain performance. This competition of supply chain performance will increase the pressure on companies to meet customer demands as well as to achieve customer satisfaction and loyalty (Hsu, 2005).

(Stakeholders Collaboration, Building Bridges for Conservation. Sep, 2000) Stakeholder collaboration is a process through which groups with similar or different perspectives can exchange viewpoints and search for solutions that go beyond their own vision of what is possible. Collaboration goes beyond people participating (passively or actively) in a process. It also extends beyond communication, cooperation, and coordination, even though these are key elements in the process. Collaboration refers to a mutually beneficial relationship between two or more parties who work toward common goals by sharing responsibility, authority, and accountability for achieving results. Collaboration is most effective when the objectives, process, and roles are clearly defined so that those involved know what to expect. Where initiatives lack a cohesive structure, or require unrealistic levels of participation (because all stakeholders—priority, secondary, and peripheral—demand equal access to the process at all times), collaboration may not be a feasible option. Other initiatives may lack credibility if certain groups have little or no say in decisions. Ensuring genuine collaboration involves recognizing the degree or level

of opportunity for collaboration that exists or is desired. The degree to which stakeholders are involved in collaboration processes can vary from a limited, consultative role in which they have little say in decisions, to shared management and decision-making responsibilities. Stakeholder collaboration is a process that will go through many iterations. Full collaboration or partnership is not always going to be the outcome. Instead, the process that stakeholders go through may reveal that other forms of action—campaigns, education, policy development, or advocacy—are more appropriate given the conservation goals and objectives identified, and the roles, positions, and interests of the various parties involved. Remember that facilitators, convenors, education and communication specialists, capacity building and conflict resolution experts, policy advisors, or lobbyists all can offer important advice and support to the collaboration process. Whatever the outcome, the stakeholder collaboration process can help a range of stakeholders—allies and opponents, public and private sector, communities and individuals— to develop a better understanding of the issues and challenges involved in achieving conservation goals and objectives at a variety of scales. Effective conservation of biological diversity is dependent on a wide and diverse range of stakeholders acting collaboratively. Today, large-scale forces such as consumption, technology, investment and trade policies, corruption, and limited capacity drive the threats facing priority conservation areas worldwide. Working independently, organizations cannot by themselves respond adequately to these pressures. Therefore, cooperation between interested and affected people and groups is necessary if the problems are to be addressed coherently. In this research also if DTAC stakeholders can work together with a more integration and collaborative manner discuss above, we can find the answers for the research questions.

"*The Art of Leading Collectively" Chelsea Green.* If we envision a planet in ecological balance, social justice around the globe, and an economic system that serves humankind while keeping the earth healthy, we must admit that sustainability demands global collaboration. As Eric Lowitt puts it in "The Collaboration Economy": “We have just begun our journey. Much work remains . . . to create a new era of prosperity that benefits our lives today while enhancing future generations’ ability to meet their needs in perpetuity.” No matter our own chosen task—managing scarce water resources, adapting

to climate change, securing access to adequate nutrition, or creating responsible value chains—the challenges of sustainability are urgent. They require new forms of collaborative inventiveness and, above all, people who are willing to implement change jointly at all levels of society. This means that we need to acquire new competencies—or revive existing ones—to create change collectively on a broad scale. When speaking about the need to work with multi-stakeholder groups, Unilever CEO Paul Polman admits, “It is an enormous learning curve as no one has been trained for this.” The learning includes developing our human capacity for outcome-oriented dialogue, effective collaboration, and future-oriented collective action across institutional or national boundaries. Isolated action needs to be replaced by collective leadership—a paradigm shift in how individuals find their leadership roles in the spirit of collaborative co-creation and contribution to the common good.

Emphasis on transparency and competitive tendering has been attacked by supporters of a more strategic approach who believe collaboration is the most effective way of achieving efficiency and effectiveness (Macbeth and Ferguson, 1994; Lamming, 1993).

As the relationship becomes more collaborative, customer and supplier move closer together. At its most basic this may be just a paternalistic strategy where the dominant customer assists in bringing suppliers "up to speed", for example through supplier development teams with the aim to "... so develop the supplier that this support will no longer be needed and performance will continue as anticipated" (Macbeth and Ferguson, 1994, p.85). A further relationship that is associated mainly with service contracts is that involved in Output Management. Here the customer sets targets based on outputs and performance with a main contractor employed to meet these targets.

The DTAC Demand management process starts just after the request letter received from Ministry of Industry and Commerce (MIC) by stating the material requirement for forthcoming year. After considering the stocks availability, past consumptions and future requirement of each material, the procurement entity of public sector organizations, have to decide the Quantity of material going to be purchase for forthcoming year requirement. After receiving requirement from all users, DTAC has to finalize the annual demand of public sector organization and DTAC has to prepare the quotation and make

arrangement to invites the bids from Domestic textile manufactures registered under DTAC in Sri Lanka. Then DTAC has to appoint bid opening Committee and make price scheduled accordingly. The TEC appointed by DTAC have to evaluate the tender file from each category to find out the best eligible bidders for each and every category and price negotiation will conduct in front of all the users as well as the domestic suppliers. The sample provided by the suppliers to be tested with the help of SLITA and the test report to be attached to main document to support the evaluation committee. In the same time SLITA members and the special committee appointed by Chairman DTAC have to conduct the capacity assessment by visiting all the factories and technical report to be provide to analyze the suppliers. After price negotiation and quantity allocation the evaluation report to be finalized by the TEC and same report be is handover to DTAC for approval. Then the approved tender document, SLITA test report, Sample and bid security to be handed over to respective servicers for further action. SLAF and other public sector users have to collect the document from DTAC and informed to the suppliers to provide performance bond prior to signing the contract agreement. If material not matching with SLAF existing colour or testing parameters not achieved during the initial testing conducted by DTAC . Same suppliers have to provide proper sample with the test report issued by SLITA. After signing the contract agreement public sector organizations procurement Division make arrangement to open a Local LC for the approved value. The process is so complicated and need work with many networks.

Companies are beginning to realize that in order to survive in the global business environment they must improve not only their organizational efficiency, but also their whole supply chain. This is because competition today is not limited between companies only, but it has extended to be among their supply chains as well. These reasons force many companies to keep up to date and make large investments in developing and implementing better technologies and systems such as enterprise resource planning (ERP) system (Davenport and Brooks, 2004).

During this process all stakeholders such as SLITA, DTAC, TEC, Users, Domestic suppliers, Ministry of Industry and Commerce and all other relevant parties have to coordinate with each other to achieve the objective. However there is no ERP base

monitoring system in present process. The link in between testing institution such as SLITA and public sector organization is very limited and developing of this relationship is very much important to achieve the government objective of "To purchase/provide Good quality uniform material efficiently and effective manner to cater for annual kit issue requirement of respective services"

2.3. **Expansion of Production Capacity**

14e,Richard B.chase, Ravishankar,F.robert Jacobs, *operation and supply chain management (*138- 142) the capacity is the output that a system capable of achieving over a period of time. In another way "the ability to hold, received or store or accommodate". Strategic capacity planning is finding the overall capacity level of capital intensive resources to best support the firm's long term strategy. Measuring of capacity utilization rate is concerned, how close the firms' current output rate to its best operating level.

In the present DTAC process, to see the relationship between capacity improvement and production enhancement, the researcher has consider the five indicators. Those indicators are number of new machines installed by the manufacturers, electricity consumption of the factories, number of employees employed, number of new factories opened and quantity of uniform material allocated by DTAC.

The concept of Focused factory, a facility designed around a limited set of production objectives, typically the focus would relate to a specific product or product group. This can be operationalized through the mechanism of **Plant within a Plant** or PWP. An area in larger facility that is dedicated to specific production objective. This can be used to operationalize the Focused Factory Concept. In this DTAC process, lead time of purchasing of raw material such as treads, dying, and etc. as import basis prior to start the production, so researcher is believing that PWP is as a one of best option to minimized the lead time of the total process

The DTAC, at the time of allocating the quantities they ensure the capacity of the manufacturer. A capacity report prepared by the SLITA is based on the machine availability. In the normal run, if the capacity of manufactures improved further they will

capable enough to reach the level what government expected. Suppliers will deliver the material to the public sector to meet efficiency and effectiveness. Suppliers have to maintain **Capacity Cushion** to meet unexpected demands. However the researcher's argument is developing the capacity furthermore is not necessary in this juncture and without further capacity enhancement the public sector can achieved this task by manipulating the supply chain drivers proper.

2.4. Quality Improvement

According to the ISO/TC 176, Quality Management Principles can be used as a foundation to guide an organization's Performance improvement. Customer focus, leadership, engagement of people, process approach, improvement, evidence base decision making and relationship management are the most important principles that any organization can be follow-up.

ISO 9000, ISO 9001, The Customer focus covers both customer needs and customer service. This principle stresses that a business should understand its customers, what they need and when. While trying to meet, but preferably, exceed customers' expectations. The Customer focus can increase the customer value, customer satisfaction, customer loyalty, revenue and market share and Customer focus enhance repeat business, reputation of the organization by expanding customer base.

Without clear and strong leadership, a business flounders. Leadership, is concerned with the direction of the organization. The business should have clear goals and objectives, and ensure its employees are actively involved in achieving those targets. Leadership increased effectiveness and efficiency in meeting the organization's quality objectives and it will provide better coordination of the organization process. Leadership improved communication between level and the functions of the organization and development and the improvement of the capability of the organization and its people to deliver desired result.

Engagement of people improved understanding of the organizations quality objectives by people in the organization and increased motivation to achieve them. It enhance

involvement of people in improvement activities. Helps to enhanced personal development, initiatives and creativity, engagement of people enhance people's satisfaction and trust and collaboration throughout the organization.

ISO 9000, ISO 9001.Improvement is essential for an organization to maintain current level of performance to react to changes in its internal and external condition and to create new opportunities. It enhance focus on root -course investigation and determination, followed by prevention and corrective action. This improved process performance, organizational capabilities and customer satisfaction. Improvement enhances consideration of both incremental and breakthrough improvement, drive for innovation and improve use of learning for improvement.

ISO 9000, ISO 9001. The process approach is all about efficiency and effectiveness. It's also about consistency and understanding that good processes also speeds up activities. Process approach enhanced ability to focus effort on key processes and opportunities for improvement and it optimized performance through effective process management, efficient use of resources. In the same time, the process approached enabling the organization to provide confidence to interested parties as to its consistency, effectiveness and efficiency.

A logical approach, based on data and analysis, is good business sense. Unfortunately, in a fast-paced workplace, decisions can often be made rashly, without proper thought. Implementing the Quality Management Principles we've discussed will allow decisions to be made with clarity. Evidence based decision making improved decision making processes and improved assessment of process performance and ability to achieve objectives. It improved operational effectiveness and efficiency and increased ability to review challenge and change opinions and decisions. Evidence based decision making increased ability to demonstrate the effectiveness of past decisions.

ISO 9000, ISO 9001. Relationship management promotes the relationship between the company and its suppliers; recognizing it is interdependent. A strong relationship enhances productivity and encourages seamless working practices. Relationship management enhanced performance of the organization and its interested parties through responding to the opportunities and constraint related to each interested party. It

improves common understanding of goals and value among interested parties. Relationship management help to well managed supply chain that provides a stable flow of goods and services. It increased capability to create value for interested parties by sharing resources and competence and managing quality related risks. Iso.org.2015

Systematic approach to management "Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives." A business focuses its efforts on the key processes as well as aligning complementary processes to get better efficiency. This means that multiple processes are managed together as a system which should lead to greater efficiency.

DTAC is a cabinet appointed tender committee and centralized platform established under the Ministry of Industry and Commerce and operating since 2005 to provide uniform material for the public sector of Sri Lanka. There are more than twenty textile manufactures operating with this process and DTAC providing facility to allocate adequate demand for them to empower the local textile industry. Improvement of quality aspect is most important and basically there are five indicators to ensure the quality of the textile material required for public sector organization. Those indicators are improvement of specifications, testing methods used for testing of fabrics, number of quality certifications received by the manufactures, new products to substitute imported materials and introduction of modern machineries. Those five factors contributes to improvement of quality of the product. When fabrics are tested with international testing methods like ISO standards manufacturers have to maintain production quality to meet those standards. When quality of the product is increased the manufacturers could compete with imported fabrics. The fabric quality is good, the possibility of rejecting material by the users is limited and material will come to user's warehouse without delay. It will directly effect to minimize the lead time gap and efficient and effective material supply.

The manufactures registered under DTAC, Users such as Arm Force, Police, STF, NCC, Prison, Health, Civil Defense and Education, Supporting agencies like SLITA, ITI, SLSI

(testing institutions), respective ministries are to concentrate about the Quality Management Principles to minimize the existing lead time gap.

2.5. **Modern Technologies**

In this business environment, innovation of organizational processes and products is a major business challenge (Tornatzky and Fleischer, 1990) and critical for firm success (DAveni, 1994; Veliyath and Fitzgerald, 2000). Innovation has been defined as ‘‘... adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization’’ (Damanpour, 1991, p. 556). Merrifield (2000, p. 42) argues, ‘‘the most viable strategy for both generating and sustaining a competitive advantage has become one of both continuous innovation and corporate renewal’’. In the past, business organizations focused on reducing costs and improving quality to gain a competitive advantage. Today, however, ‘‘companies must be able to innovate at the global frontier... and create and commercialize a stream of new products and processes that shift the technology frontier, progressing as fast as their rivals catch up’’ (Porter and Stern, 2001, p. 28). One area of innovation that has been the focus of significant discussion is information technology adoption. US executives allocate 40% of new capital equipment investment to technology (Hitt and Brynjolfsson, 1996). Innovative information technologies have the capacity to impact organizational structure, firm strategy, communication exchange, operational procedures, buyer– supplier relationships, and bargaining power (Bowersox and Daugherty, 1995; Lewis and Talalayevsky, 1997; Williams et al., 1997; Clemons and Row, 1991). Information technology may also increase organizational productivity, flexibility, and competitiveness (Cash and Konsynski, 1985) and stimulate the development of inter organizational networks (Daugherty et al., 1995). Information systems have become so pervasive that they are now considered to be a requirement for doing business in today’s competitive marketplace (Clemons and McFarlan, 1986; Dawe, 1994; Rogers, 1990; Rogers et al., 1992). Supply chain management is recognized as an important area for information technology innovation and investment (Bowersox and Daugherty, 1995). Supply chain management has been defined by The Global Supply Chain Forum as ‘‘...the integration of key business processes from end

user through original suppliers that provides products, services, and information that add value for customers and other stakeholders'' (Lambert et al., 1998, p. 1). With implementation of supply chain management, the narrow focus of managers and the adversarial relationships between logistics providers, suppliers, and customers are replaced with strategic alliances and long-term cooperative relationships and viewing suppliers and customers as partners instead of adversaries (Tan et al., 1998) with the objective of ''maximize(ing) competitiveness and profitability for the company as well as the whole supply chain network including the end-customer'' (Lambert et al., 1998, p. 4). Better information exchange between supply chain partners, perhaps the key advantage of an integrated supply chain (Lee et al., 1997; Levary, 2000), provides more up-to-date information and allows for more accurate inventory responses to changes in demand and thus

Usage of modern technologies in DTAC purchasing process is measured by using three indicators. Those indicators are nature of technology, category of advanced technology and machine efficiency rate. To maintain high productivity and efficiency it is necessary to introduce new technology into the industry. To meet the increase demand for the state sector uniform material requirement, manufacturers have to maintain high productivity and the efficiency rate. For this requirement introducing new technologies is an important factor. New technology can minimized the manufacturing lead time and finally it effect to minimized the total lead time gap and help for efficient and effective material supply.

A variety of organizational factors have been suggested to impact innovation and technology adoption. Size has been one of the most researched variables, which has led to some disagreement of the direction of the relationship. It is theorized that larger organizations have the financial and technology resources to invest in new technologies and absorb the associated risk (Grover and Goslar, 1993). Furthermore, large organizations may have slack capacity to devote to adopting and implementing new technologies as well as to enjoy the benefits of economies of scale from Supply Chain Technology adoption. Alternatively, others have suggested that smaller organizations are more likely to be innovative because of the flexibility a orded by smaller size and fewer levels of bureaucracy. Previous research, regardless of the measures used to evaluate size

and adoption, has consistently indicated organizational size positively correlates with technology adoption (Dewar and Dutton, 1986; Rogers, 1990; Dawe, 1994; Germain, 1993; Germain et al., 1994). Studies examining individual technologies such as EDI, (Williams, 1994; Daugherty et al., 1995; McGowan and Madey, 1998; Premkumar et al., 1997) also found firm size to be an important factor to the adoption decision. Cragg and King (1993) showed that lack of technical knowledge and resources inhibit technology adoption in small firms. Thus, larger organizations are expected to possess the financial resources and risk capacity necessary for new technology investments and will be associated with greater levels of supply chain technology.

2.6. Government Incentives

Baker Tilly's, why does government provide incentives, government can offer financial assistance to private businesses making investment through the use of economic incentives. incentives can include tax abatements, tax revenue sharing , grants, infrastructure assistance , no or low interest financing ,free land, tax credit and other financial recourses. But the question is, why? Why do government agencies invest public resource to support business development? The answer lies within the classic "but for" requirement of economic intensives. Understanding the "but for" and how to properly prepare the information required by government entities is critical your project success. By providing assistance through incentives, government is choosing to invest Public resource to make privet investments feasible and therefore receive investment return in the form of economic impact.

Introduction of government incentives is measured by using two indicators. Those are nature of protection and nature of incentives and facilities. The government incentives and facilities would help to empower the local textile manufacturers from their level in 2006 to 2018. Deliberating the extent of government incentives, protection, facilities and other concessions granted to local textile industries may help to empower the local textile industry and enhance the capacity. In addition researcher could see how far local textile manufacturers utilized those incentives and protection for the development of the

industry and minimized the manufacturing lead time to fulfilled uniform material requirement of the public sector organizations.

2.7. **Material Acceptance**

The receipt of goods into a warehouse needs to be a carefully planned activity. In most large warehouses, incoming vehicle loads are booked in advance so that the appropriate resources can be allocated to the activity. On arrival, drivers report to the gatehouse, where staff check the vehicle documentation and direct the driver where to go, either directly to an unloading bay or to a parking area. On unloading, the goods are normally checked to ensure that they are the correct items and of the required quantity and quality. This may be undertaken by cross-checking against purchase orders, but this can be very time-consuming. An alternative method is for the sender to transmit an Advance Shipping Notice (ASN) by EDI and for this to be related automatically to the appropriate purchase order. The goods can then be checked specifically against the ASN for that vehicle. For approved and trusted suppliers, it may be that the quantity and quality can be assumed to be correct as per the ASN, in which case the goods can be unloaded and transferred immediately to storage. If goods are to be quarantined (eg stored until quality control results are available), then this can be undertaken by placing the goods into the normal reserve storage area and using the warehouse management system to ensure that the goods are not picked for any customer orders. When the goods are ready for placing into storage, they may be put away and the computer system advised of the location number or, more normally, the warehouse management system would identify the most appropriate location and issue a put-away instruction (eg. on a paper put-away sheet or transmitted to a truck driver's radio data terminal). A key objective in designing the receiving process is to enable the goods to be put away to the required location in the warehouse with the minimum handling and minimum delay possible. This often requires close co-ordination with suppliers, in terms of procurement agreements and the timing of deliveries.

Existing item acceptance procedure (receipts) at R&D SMD is directly affected to increase the lead time gap. The space available at R&D is for unloading and storing is

not sufficient enough to receive the all type of material from DTAC suppliers at a once. There are no machines to measure the length of the fabric roll to count total received material Quantity. Quality acceptance team appointed by Air HQ has to believe the suppliers packing note and get total count. No machines for loading unloading and all task conduct by manually. No special personnel to read and understand the SLITA test report coming with the material at R&D. No Bar cord, No RFID or any other automated counting measures. Therefore, the time taken to accept the item to stores is very high. Members of acceptance committee has to get the help of Directorate of Logistics and special institutions such as SLITA, SLS and etc . This will directly effect to dilly the material BOC process.

2.8. **Higher level supervision (Moderator variable of the Study)**

The moderate variable of this study is identified as the **higher level supervision**. It is most likely that the moderating variable has a strong contingent effect on the relationship between the independent and dependent variable. Supervision among the individual variable may reduce the lead time and enhance the effectiveness and efficiency of the supply chain partners

2.9. **Efficiency and effectiveness in purchasing for production**

Efficiency refers to how economically the organization's resources are utilized whereas effectiveness refers to how accurately the organization's products or services satisfy the customer's needs. Efficiency measures how successfully the inputs have been transformed into outputs whereas Effectiveness measures how successfully the system achieves its desired outputs (Oxford Dictionary of Business, 1996).

Heinritz et al, (1991), discusses how to measure purchasing performance with a focus on efficiency and effectiveness. In addition they argue that efficiency is measured against budgeted cost and defend this position by saying, "the end result of purchasing is product cost, and the measurement of purchasing performance can logically be based on that consideration (pp. 403). As regards effectiveness of purchasing,

Indeed, even in the literature surveyed there is no commonly agreed position on what should actually be measured in procurement. For instance, Axelsson & Heilman (1991, quoted in Knudsen, 1999), detail six areas that should be measured. These are: suppliers, price issues, delivery service, stock levels, cost savings, operational efficiency. All these are also measured in terms of their contribution to their cost or profit of an enterprise.

Heinritz et al, (1991), consider the performance indicators as: cost savings, inventory performance, cost avoidance, supplier quality, supplier delivery management, and transportation management among others. All of these parameters are measured in terms of their contribution to purchasing cost or cost avoidance. This adds to the trend that the purchasing activity is traditionally measured.

According to the Center for advanced Purchasing (Dobler and Burt, 1996, 690), the following are the ten most commonly used procurement performance measures:

i. Material cost reductions produced by joint buyers-supplier efforts, categorized by material and supplier;

ii. Percentage of major suppliers that deliver on time, noted by material;

iii. Percentage of orders received within a specified number of days of the due date, noted by material;

iv. Internal customer satisfaction;

v. Material cost savings generated from centralized and consolidated by activity;

vi. Material quality defect rate categorized by material and supplier;

vii. Documented improvements attributed to strategic supplier partnerships;

viii. Average supplier lead-time by major materials;

ix. Percentage of major suppliers certified to the buying firms standards; and

x. Number of long term contracts in place along with dollar volumes.

2.10. Government intervention related to DTAC process

The main objectives of industrial policy of the Sri Lankan government are expansion, diversification and upgrading of the domestic industrial base, efficient management of physical and man power resources, creating of new employment opportunities, export promotion and the promotion of industrialization at the regional level. These objectives are expected to be achieved by making the Macro Economic environment conducive to rapid industrial growth, encouraging private sector participation, promoting direct foreign investments, etc.

The duties on textiles and other related raw materials were abolished in the 1998 budget. Accordingly the import of yarn , fabric and all related intermediate and capital goods were made duty free from November 1997.This measure is expected to eliminate custom delays, smuggling and under invoicing and also to reduce the lead time of exports. In addition, a restructuring program for the textile industry was launched to assist the industry to modernize its mills and to introduce new generation technology to increase efficiency and competitiveness.

In addition the government set up a special fund in1998 known as the textile debt recovery fund to transfer all outstanding loans, together with the accrued interest of the textile manufacturers. Upon transferring the outstanding debt to the fund the enterprise become eligible to obtain new financial assistance for modernizing and restructuring the mills against the collateral/ mortgage already furnished as security for previous loans. The government has also decided to procure from these manufacturers the requirements of fabric material for school uniforms, Gauze material to hospitals, uniforms required for service personnel, etc. until their products reach the quality standards demanded by international markets.

2.11. The procurement functions in public sector

Procurement function with related to textile material for public sector organization can be basically categorized in to two parts.

a. Through DTAC
b. Through government procurement procedure

2.11.1. Through DTAC

In terms of special gazette notification dated 08.12.2005 the function of textile industry was assigned to the Ministry of Textile Industry Development (A new ministry). Accordingly Minister of Textile Industry Development has submitted a cabinet memorandum dated 30/01/2006 seeking approval for further implementation of the;

a. Already approved exercise of procuring the textile requirements of the government. institutions as per the decision of the cabinet of ministers taken on 30.03.2005 in relation to cabinet paper no: 05/0468/009/106-1
b. Establishment of the Domestic Textile Allocation Committee.
c. Functioning of the DTAC as a Cabinet Appointed Procurement Committee (CAPC) in respect of the procurement of textile requirement of the government institutions.

The cabinet which met on 08/02/2006 granted approval to the above cabinet memorandum.

As per special gazette notification dated 29.01.2007 the function of textile subject was again assigned to ministry of Industrial Development. Since then the DTAC function has been handling by the Ministry of Industrial Development. From April 2010, the name has changed as Ministry of Industry and Commerce.

In response to the paper advertisement published by the Ministry of Industry and Investment Promotion, following local textile manufacturers were registered for the year 2005. In the capacity evaluation process it was identified that the weaving capacity of the

country is limited. However there was ample processing capacity in the country. Therefore the DTAC decided to purchase textile materials on a two pronged basis, namely weave and Process category and Import and Process category.

Through the 2005 budget proposals the government has decided to procure all Government textile requirements of Armed forces, Police, Prison and other government agencies including materials for school uniform from local textile manufacturers in order to assist the local industry.

The government continuously supported development of the textile industry and in the latest 2012 budget the following steps were taken to protect the industry.

a. Imposing a Cess of Rs.75/- per kg for imported textiles.
b. A tax of only Rs. 25/ per KG for Imported cut fabrics up to 2 meters used by SME's engaging in soft toys and hand bags.
c. Companies who locally produce fabric to replace imports of fabric with an investments of us $ 5 million will get special income tax exemptions and concessions.
d. Free from all taxes on all yarn (excluding sewing thread and vegetable fiber) to facilitate handloom or fabric manufacturing.
e. Textile Exporters will be permitted to sell 25% of the production to the local market at all-inclusive rate of Rs.40 per kg.

Above mentioned incentives and protections are helpful to empower the domestic textile manufactures and it will effect to minimize the lead time gap of purchasing material from domestic material manufactures registered under DTAC. During the research study this concepts and policies taken as a guideline.

KPMG Ford Rhodes Thornton & Co. *BOI Incentive Schemes,(1998), and* BOI (*2005) Grants special tariff incentives benefits for export production of Sri Lanka.*

2.11.2. Government procurement procedure

When public sector organization apply the government procurement procedure following are the methods

a. International Competitive Bidding (ICB)
b. National Competitive Bidding (NCB)
c. Limited International Bidding (LIB)
d. Limited National Bidding (LNB)
e. Shopping
f. Direct Contracting (DC)
g. Repeat Orders

2.12. Objectives of a public sector procurement plan

(Procurement guideline 2006).The objectives of procurement plan are as follows

a. To complete the procurement process on time.

b. To be able every stage of the procurement to be monitored, thereby minimize delays.

c. To have time targets for EA, Technical Evaluation Committee and Tender Board to work on.

2.13. Objectives of public sector procurement

(Procurement guideline 2006). Primarily the overall objective is the acquisition of the right quality, in the right quantity, at the right price, at the right time, from the right source. The primary objectives of purchasing are as follows:

a. To buy at the right price. Maximizing Economy, efficiency and effectiveness (From the lowest acceptable bidder if possible

b. To have a high inventory turnover, thereby diminishing excess storage, carrying expenses and inventory losses as a result of deterioration, obsolescence, and pilferage.

c. To maintain continuity of supply, preventing interruption of the flow of materials and services to the users.

d. To maintain a consistency of quality which permit efficient and effective mass production.

e. To develop reliable alternate sources of supply to promote a competitive atmosphere in performance and pricing.

f. Adhering to prescribed standards, specifications, local laws rules and regulations and international obligations.

g. To develop, motivate and train personnel to fulfill the objective and provide a reservoir of executive talent.

h. To develop good supplier relationship in order to create an attitude and desire to furnish the organization with new ideas, products, and better prices and services.

j. To achieve a high degree of cooperation and co-ordination with other departments, especially those which are directly supported such as engineering and operational functions.

k. To maintain good records and controls which would lead to assure efficiency and honesty.

l. Ensuring Transparency; and Retaining confidentiality of information.

2.14. Main stakeholders and their role in DTAC Purchasing

As per the cabinet approval dated 30.03.2005, the Ministry of Industry and Investment Promotion has established the DTAC. Following officials were nominated to the first DTAC established in 2005.

- Additional secretary , Ministry of Industry and Investment promotions
- Additional Secretary , Ministry of Education
- Additional Secretary , Ministry of Defense
- Additional Director General, General Treasury
- Director General SLITA
- Director General Textile Quota Board
- Chief Accountant, Ministry of Industry and Investment Promotion
- Director , Department of Textile Industries

Division of Textile & Productivity Improvement headed by a Director of the Ministry of Industry and Investment Promotion handled the procurement activities. Sri Lanka Institute of Textile and Apparel(SLITA) provided technical support to the scheme such as preparation of specifications, testing and approving pre-production samples, preparation of price formula, assessing manufacturing capacity of the manufactures, sample testing, assisting to evaluate the bids, monitoring manufacturing process and testing and issuing conformity certificate to the finished product.

2.15. Weave and Process category

In this category the process starts from import of yarn. After the weaving, processing is done locally. Priority was given to this category and the main objective is to encourage local weaving industry.

2.16. **Import and process category**

Under this category the textile processing mills were given the opportunity to import grey fabrics (unfinished fabrics) and to process them locally. The left over quantity after allocating to the weavers were given to this category.

Some manufactures have been registered in both categories where as some of them are in one category only. There are manufactures who have no capacity for doing all the processing steps in the production process. Such events he can get the assistance from a manufacturer who has such facility to accomplish the task. Such a situation the manufacturers shall provide a letter obtained from the manufacturer who can undertake that facility along with the bidding document. Public sector organizations have to purchase their uniformed requirement through DTAC and manufactures have to fulfill the material requirement within the time frame agreed in the contract agreement. The process of purchasing material from DTAC conduct once in year and public sector has to submit their forthcoming year requirement accordingly

2.17. The process of manufacturing woven fabrics

The textile woven process can be shown as follows. D.P.Gunewardena, *Textile manufacturing*

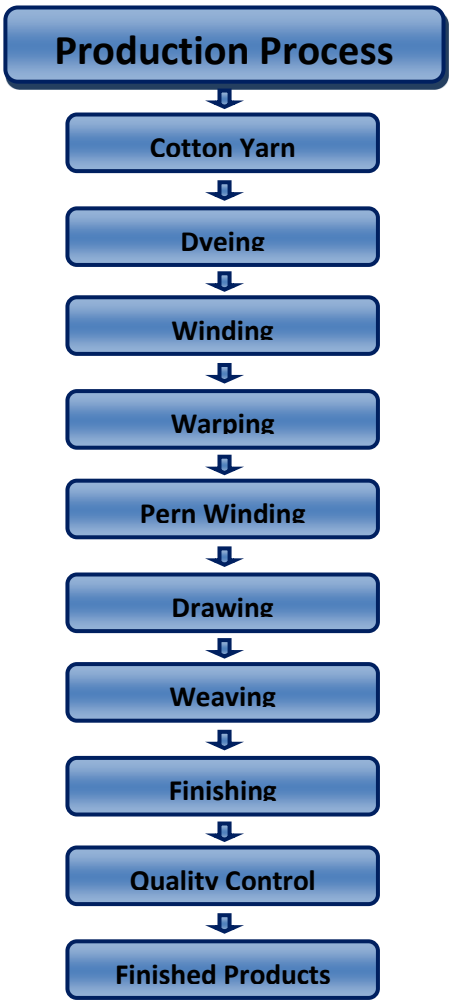

Figure 2-2 Production process of textile materials

Basically there are 4 steps in weaving and 9 steps in processing of fabrics. Valuable

Weaving-

1 Warping- winding the yarn to a beam

2 Sizing- adding starch (Sizing) and preparation of the weaving beam.

3 Pirn winding- winding pirns required for the crosswise thread (in shuttles weaving this process is not required)

4 Weaving-output-grey fabric

Processing-

1 Shearing and cropping- in this process the protruding threads of the grey fabric are cut.

2 Singing- Burning out protruding fibers to get a smooth finish

3 Desizing- Chemical process, removal of starch added for weaving..

4 Mercerizing-A chemical process to add luster to fabric

5 Bleaching-

6 Dyeing- Colouration

7 Sanforizing-a preshrinking process

8 Stentering- Finishing and setting the width

9 Calendaring- Pressing the fabric-Similar to ironing

(D.P.Gunawardena, *Textile manufacturing*.)

2.18. The roll of the Technical Evaluation Committee (TEC) to assist the DTAC

(Procurement guidelines NPA in 2006)

Assistance of a Technical Evaluation Committee (TEC) has not been obtained from 2005-2007. The DTAC has done evaluation, negotiation and allocation of quantities. The cabinet approval for the establishment of the DTAC has also not mentioned about a TEC. But Procurement guidelines issued by NPA in 2006 have provision for appointing TECs to assist all procurement committees. From the year 2008, the DTAC has obtained the service of a TEC which has been appointed by the Director General of Public finance. The TEC has five members selected from General treasury, Ministry of Education, SLITA and the Ministry of Industry and Commerce.

During the study researcher identified that TEC is having a responsibility to select best supplier among domestic textile manufactures under DTAC purchasing process. Procurement guideline issued in 2006 very clearly stated the responsibility of TEC and their roll during the tender evaluation process. TEC can play bigger role when material purchase through DTAC.

2.19. The roll of the Sri Lanka Institute of Textile and Apparel (SLITA) when material purchase through DTAC

(SLITA, *Annual Report- 2011)* Task allocated for SLITA and DTAC as follows

Sri Lanka Institute of Textile and Apparel which has been established by amalgamating the Textile and Training Centre and Clothing Industry Training Institute, officially came into operation on 15th of June 2010. Both predecessor Institutions as well as the new institute focused its' attention to the business of providing Training and technical services including testing of Textiles and allied products to the industry. The testing activities has been providing for both government institutions and public sector, especially garment industry.

The Institute continued to play its' role in Domestic Uniform Manufacturing Project for school children, armed forces, police and other government institutions by way of drawing up specifications, ascertaining capacities and capabilities of manufactures, providing technical guidance when necessary to the manufacturers

In 2009 quality management system of the textile testing laboratory of the Institute has been upgraded to ISO 9001:2008 version and was able to obtain the re-certification. The laboratory also enhanced the scope of ISO17025:2005 Accreditation by introducing few more tests that were being frequently requested by its' clients. Laboratory was also awarded the gold certificate as a testing facility for conducting test for Lumped Brand, one of the key of retailers' underwear of USA

During the study researcher identified some important factors which helps to minimize the lead time gap of material purchasing from DTAC. Especially the roll of the SLITA is very much important to receive good quality textile material on time. Inter coordination among this institutions is the most important aspect this study concerned.

2.20. Decentralized system

Organizations that have adopted a flatter, more decentralized structure would be expected to have adopted more innovative and cutting edge technology in order to enhance communication and coordination within the organization as well as with supply chain members (Bowersox and Daugherty, 1995). Grover and Goslar (1993, p. 142) suggest that the ‘‘decreased autonomy and bounded perspective’’ of a centralized organizational structure explain the negative relationship often found between centralization and adoption.

Public sector purchases can be done in organizational level for all other items except clothing. When it comes for uniform material and other required clothing items decentralized procurement process cannot be apply unless otherwise if it a special case. In a normal context approval to be obtain from the defense ministry and treasury to conduct de centralized purchases. However, due to high lead time and issues like quality and price variations some public sector organization has been deviated from the DATA purchasing process.

Ex-Education Ministry has taken a decision and vacates the DTAC purchasing procedure for purchase of School uniform and decided to provide coupon system since 2016.

2.21. Centralized system

A variety of organizational factors have been suggested to impact innovation and technology adoption. Size has been one of the most researched variables, which has led to some disagreement of the direction of the relationship. It is theorized that larger organizations have the financial and technology resources to invest in new technologies and absorb the associated risk (Grover and Goslar, 1993). Furthermore, large organizations may have slack capacity to devote to adopting and implementing new technologies as well as to enjoy the benefits of economies of scale from adoption. Alternatively, others have suggested that smaller organizations are more likely to be innovative because of the flexibility afforded by smaller size and fewer levels of bureaucracy. Previous research, regardless of the measures used to evaluate size and adoption, has consistently indicated organizational size positively correlates with

technology adoption (Dewar and Dutton, 1986; Rogers, 1990; Dawe, 1994; Germain, 1993; Germain et al., 1994). Studies examining individual technologies such as EDI, (Williams, 1994; Daugherty et al., 1995; McGowan and Madey, 1998; Premkumar et al., 1997) also found firm size to be an important factor to the adoption decision. Cragg and King (1993) showed that lack of technical knowledge and resources inhibit technology adoption in small firms. Thus, larger organizations are expected to possess the financial resources and risk capacity necessary for new technology investments and will be associated with greater levels of supply chain technology.

Organizational structure has also been considered an important factor to technology adoption (Williams, 1994). Previous research has provided ambiguous results with some studies indicating positive effects of a centralized organizational structure (i.e., concentration of decision-making) on technology adoption while others have shown negative relationships (Gatignon and Robertson, 1989). Pierce and Delbecq (1977) suggest centralization of decision-making may reduce conflict between organizational units and foster innovation adoption. In support of this proposition, Ettlie et al. (1984) found that organizations with a centralized structure were more likely to adopt new technologies.

According to the Gazette notification published in 2005, Public sector organization has to follow the centralized procurement process through DTAC to fulfill the annual uniform material requirement. DTAC is centralized purchasing system and Demand Management, invitation of bids, Suppliers management, scheduling, evaluation, negotiation, capacity measuring, quantity allocation and production monitoring and testing are conducting in a centralized flat formed to empower the local manufactures as well as to provide good quality material to public sector will minimizing imports.

2.22. Effective an efficient supply of uniform material

To achieve the Efficiency and Effectiveness in public sector purchases there are some essential right to be achieved. To convert the DTAC purchases in an efficient and effective manner, all bellow aspect to be accomplished.

- Having the right item

- In the right quantity
- At the right time
- At the right place
- For the right price
- In the right condition
- To the right user
- With the right intention

The DTAC purchasing process is a centralized purchasing system and all the public sector organizations have to project their forthcoming year uniform material requirement to DTAC. System implemented in year 2005 and during last 14 years' time most of public sector organizations have been fulfilling the material requirement from DTAC with a plus and minus issues. Due to inefficiency and ineffectiveness of the long process some organization fully evacuate the system and some are partly evacuated the purchasing process.

2.23. Effectiveness of procurement

Effectiveness is measured by the extent to which stakeholder's /customer's requirements are met over time. It is the degree to which objective or target is met. Effectiveness generally means that one can accomplish tasks that fit in with overall objectives. It is not effective to manufacture units of product 'y' if one is already overstocked with it, no matter how economically or efficiently one does it. Similarly, it is not effective if one has product 'y' in stock but cannot convey it promptly to the internal or external customers who need it. (Partha Pratim Saha, MPSM, 2015)

Effectiveness of procurement process is the key issue in the procurement performance which is fundamental to guarantee cost-effective delivery of goods and services in any organization (Public or Private). Regardless of its importance; assessing procurement process effectiveness seems to be a challenge task especially in government entities since it relates with the personnel target performance. This is result oriented. Effectiveness of procurement has a broader approach; effectiveness refers to the extent to which something has been done, to achieve the targeted outcome. It means the degree

of closeness of the achieved objectives with the predetermined goal to examine the potency of the whole entity.

2.24. Efficiency in procurement

Efficiency is measured in terms of how economically the organization's resources are utilized in providing a given level of stakeholder's/customer's satisfaction. It is the relationship between inputs and outputs achieved. The fewer the inputs, both goods and services, used by an organization to achieve a given output, the more efficient the organization is. It essentially means that one should complete tasks without waste of inputs. If product 'y' normally takes 2.0 units of item 'x', in its manufacture, and one can manage to provide it using only 1.8 units, then he has been efficient. If it takes 2.2 units of item 'x', he has been inefficient. (Partha Pratim Saha, MPSM, 2015)

Develop processes to drive efficiency throughout the public procurement cycle in satisfying the need of the government and the public sector organization. Whatever DTAC produce and deliver to public sector organization are to be done in perfect way. Efficiency of procurement is the state of attaining the maximum productivity with least effort spent.

To achieve the efficient and effective procurement, there are many things to complete. DTAC process should able to provide right product, at right price in a right place, in a right quantity, in right quality, in rite time and with right intention. If one of above concept not been fulfilled through DTAC purchasing process efficiency and effectiveness cannot be achieved. Due to high lead time, quality issues, and capacity issues the process not efficiently help to obtained uniform material to public sector organization.

2.25. **Performance measurement**

According to Nelly (1998), performance measurement is the process of quantifying the efficiency and effectiveness of past action. It is the gathering of information about the work effectiveness and productivity of individuals, groups, and larger Organizational units (Larsen & Callahan, 1990). It involves systematically collecting and strategically using information, on an ongoing basis, in an intra- and inter-organizational fashion, and for a variety of internal and external purposes (Dusenbury, 2000).

Performance measurement represents a process where the focus is on the internal process of quantifying the effectiveness and the efficiency of action with a set of metrics (Neely, Gregory and Platts, 1995). It represents management and control systems that produce information to be shared with internal and external users. Furthermore, as it encompasses all aspects of the business management cycle, it constitutes a process for developing and deploying performance direction (Nanni, Dixon and Vollmann 1992).

Performance measurement is traditionally viewed as an element of the planning and control cycle that captures performance data, enables control feedback, influences work behavior (Flamholtz, Das and Tsui 1985) and monitors strategy implementation (Simons 1990).

From the foregoing it is apparent that performance measurement is concerned with an organization/ department's efficiency and effectives. According to Nelly (1998) an organization's efficiency and effectiveness are two most fundamental dimensions of performance and hence those two must be measured.

A performance measurement system enables informed decisions to be made and actions to be taken because it quantifies the efficiency and effectiveness of past actions through the acquisition, collation, sorting, analysis, interpretation and dissemination of appropriate data (Nelly, 1998).

A performance measurement system operates with exhaustive and carefully selected performance indicators. Performance indicators specify the types of evidence, qualitative

and quantitative, used to assess performance and results. These will include indicators of productivity, effectiveness, quality, timeliness, and responsiveness (Wholey, 1983).

The Government of Sri Lanka, MIC, and DTAC should concentrate on this Performance Measurement aspect in all level of DTAC supply chain. So, investment and motivation on research and development (R&D) to be concentrate more and more.

2.26. Relate to other different types of materials

Other than the uniform and textile items, decentralized government procurement procedures can be apply through respective procurement authorities. Normally the lead time of decentralized processes of public sector organization is lesser than the DTAC purchasing process. In this context, coordination among the internal stakeholders can be increases with high level supervision of the respective organization. However, Purchasing of uniform material for public sector organizations are to be progress only through DTAC purchasing process and existing process may have many difficulties and users are facing many difficulties. Uniform materials which are to be manufactured under special condition with deferent technologies where local manufactures does not have the facility can be purchase through procurement entities of the particular organization. This process, there are 13 steps to complete and lead time of each step is less than DTAC purchasing process.

2.27. Previous Empirical Literature on the focus of this study area

During the literature survey researcher seek the availability of previous empirical literature on the focus of this study area. Through the web researcher found the paper publish by Zameer Ahmad 2009 under the topic of "research report on Pakistan's textile industry" following theoretical framework used to express his idea.

Zameer Ahmad 2009 defining the problem and setting the objectives his research needs to establish theoretical frame work. His theoretical framework comprises on the followings:

Inventory of Variables

Dependent Variable:

Growth of textile sector

Independent Variables:

Investment facilities (includes both foreign & domestic)

Protectionism to investors

Export

Technology

Core Competencies

Quality

Processing/Production infrastructure

Education

Cost of production

Pricing

Skilled human resource

Moderating Variable:

Image of Pakistan

Intervening Variables:

WTO Policies

Govt. policies & regulatory system

The theoretical relationship modal used by Zameer Ahmad under his "research report on Pakistan's textile industry"

Moderating Variable

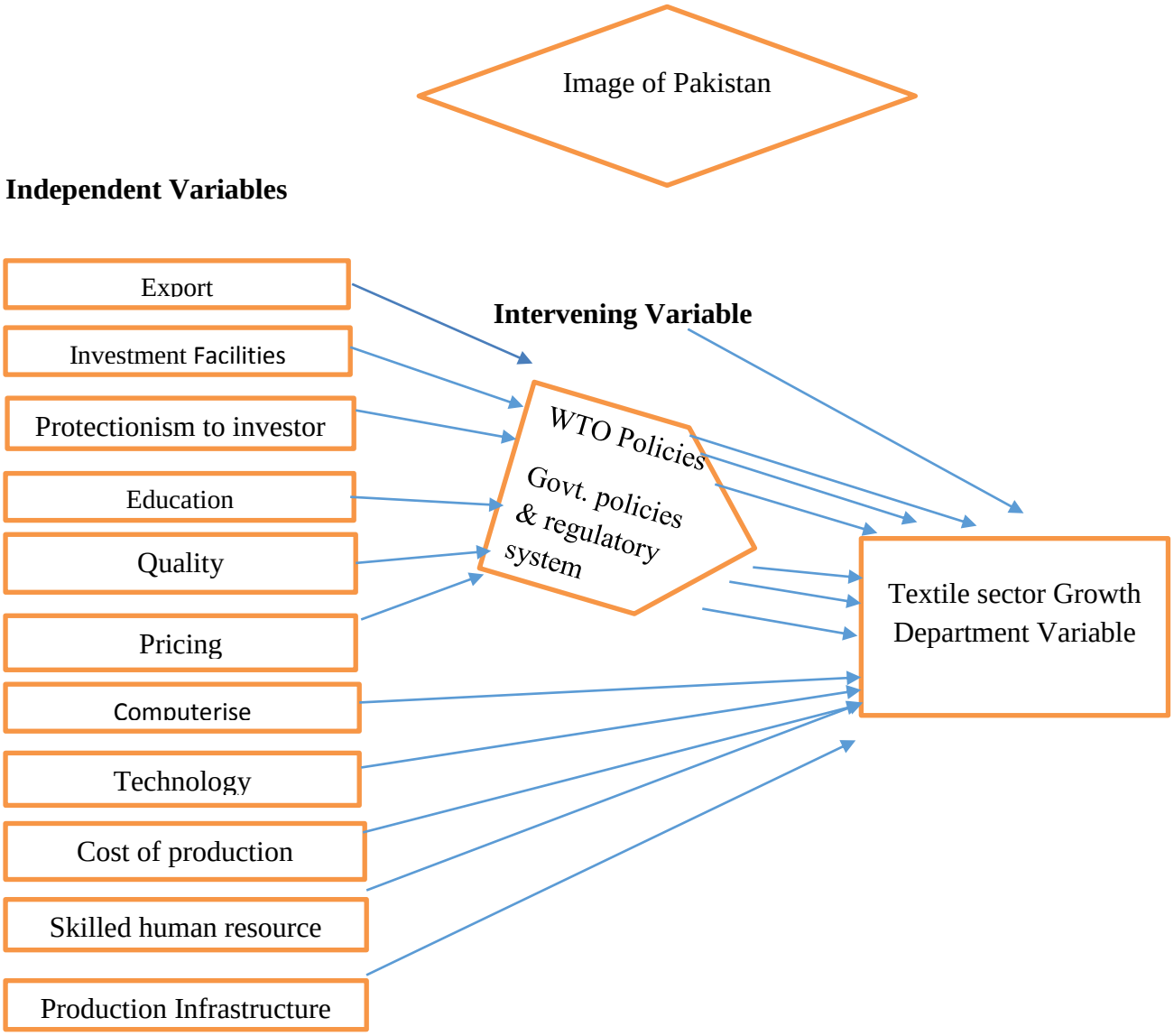

Figure 2-3related modal 1

During the current research study the researcher used some important variables used by Zameer Ahmad under his "research report on Pakistan textile industry" to prepare six important variables with related to lead time gap and weaknesses of uniform and material purchase through Domestic Textile Allocation Committee to public sector organization in Sri Lanka since 2005. Specially independent variable such as,

- Protectionism to investors (Government incentives and protection),
- Technology development
- Quality
- Capacity (Processing/Production infrastructure, core competency, New factory opened, cost of production like Power utilization)
- In addition to that, researcher examine the impact of collaboration and integration among the stakeholders
- Material Acceptance at respective servicers,

Researcher critically analyzing above influencing factors to give more focus to identify the reasons for lead time gap and inefficient and ineffectiveness of material supply through DTAC purchasing process.

The price of the product decides by the DTAC committee with the suggestion of all influencing bodies during the negotiation and quantity allocation meeting prior to finalize the tender. So once the price setup for one institution same will be applicable for other services if the product specifications are similar. Therefore researcher has not taken product price as a key variable for this study.

As we know, export is major variable when production is concern in any industry however export are not applicable for this DTAC process,

The import is concerned, imported raw material are essential to being with this DTAC process. However, getting the import details from DTAC suppliers is not possible and not practicable due to industry myopia which I am going to prove during the study. Further, when literature of other related research concerned, researcher found valuable argument given in Dissertation submitted in partial fulfillment of the requirements for the Degree of Masters in Procurement and Supply Management by: Partha Pratim Saha MPSM, with related to Factors Affecting the Efficiency and Effectiveness of Emergency Procurement in Bangladesh Water Development Board (BWDB). Following are the conceptual framework developed by them.

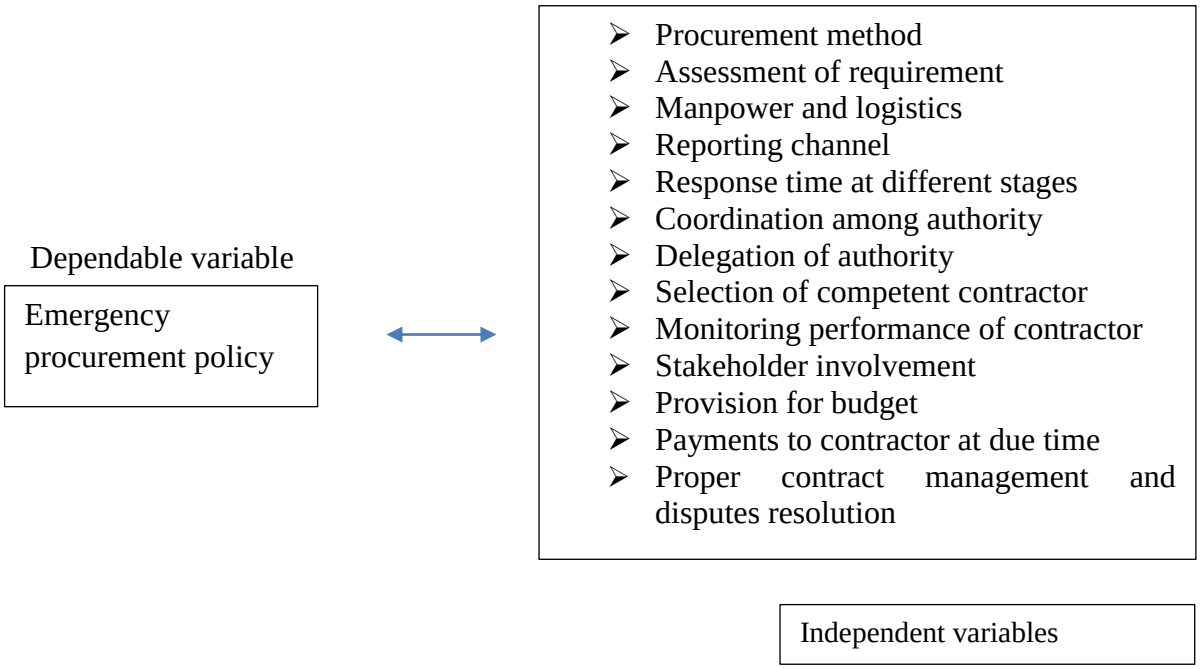

Figure 2-4 related modal 2

Out of several variables given above, the Researcher extracted the **Coordination among the Authority** when setting independent variable for this study.

In another study in which emphasis on check the MFA effects on Pakistani textile sector was explored. This study (Chaudhry & Hamid, 1988) tells that Multi-fiber Arrangements (MFA) leads to harmful consequences for the textile industry of Pakistan. For instance, it stalled modernization of the sector, as the government provided incentives for expanding low-cost power loom sector at the cost of an organized mill sector, to reap the advantages of low-cost. The resulting feature was the technological backwardness of Pakistan textiles. Encouragement of the power loom, leads to the decline in mill production and consequently closure of the huge installed capacity. Researcher believes that purchasing of public sector uniform material from DTAC in Sri Lanka is similar to this.

2.28. State of Textile Industry in Sri Lanka

The textile industry has gradually developed as an import substitution industry during the period 1956-1977. Until 1977, textile imports by the private industry were banned and the government enjoyed the monopoly of import and distribution of fabrics in the country. The local textile industry was dominated by the large state-owned textile factories build with foreign assistance while relatively small private textile firms were also in operation under protection and controls.

The production was entirely targeted towards the local market. There was no competition among the local producers because often demand exceeded supply. The price controls and the lack of supply of good raw materials resulted in the lowering of quality but maintained profit levels.

Trade liberalization introduced since 1997 exposed the industry to the competition from imported textiles, particularly from better quality low priced imported textiles. However, until 1998 the textile industry in Sri Lanka was protected by high tariff rates, which were gradually, reduced from 100% in 1977 to 35% in 1996. In 1998, tariffs on textile imports were completely removed to liberalize the textile trade. It is apparent that the Sri Lankan textile industry has not kept pace with the global technological transformation and the unit cost of production remained high resulting in the local textile industry being less competitive.

During 1977 to 1998 industries consists of 8 spinning units, 120-125 weaving units and around 50 knitting units. A large number of these units except for the few export-oriented projects were equipped with outdated machinery and mainly served the domestic market. However the government of Sri Lanka has offered a wide range of tax concessions and investment incentives to investors to encourage towards export orientation.

The slowdown which started in 1980 in the textile industry continued in 1997 and worsened after the government's 1998 budget which waived off the import duties on yarn and fabric. The prospects for the year 1999 also do not indicate any signs of

improvement; however the factories established with special concessions for exports reflects better performance.

The 8 spinning units annually produce around 32,000 tons of yarn: spun yarn, 28,000 tons and filament yarn, 4,000 tons.

In the fabric manufacturing sector the factories annually produce around 225 million meters of fabric, woven fabrics 180 million meters and knitted fabrics 45 million meters.

Sri Lankan Textile mills (power-looms) mostly produced sarees, shirting, suiting, dress materials, chintz poplin, etc. while the handloom industry produced household items such as bed linen, table linen curtaining, furnishings, sarongs or lungi's, towels, etc. For the domestic market the export oriented textile factories produced mainly for the requirements of export markets such as sheeting, twill, shirting, poplin and taffeta.

Sources

Central Bank of Sri Lanka – *Annual Report 1998*

Ministry of Industrial Development. *Textile Statistic of Sri Lanka-1998*

KPMG Ford Rhodes, Thornrton & Co., *BOI incentive Schemes, November 1998*

2.29. Concept of Lead Time in Domestic Textile Allocation Committee Purchases

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors (Kaming et al 1997). Delays are incidents that impact a project's progress and postpone project activities; delay causing incidents may include weather delays, unavailability of resources, design delays, etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship (Vidalis et al 2002).

Choudhry (2004) and Chan (2001) defined the time overruns as the difference between the actual completion time and the estimated completion time. It was measured in number of days. Project delays are those that cause the project completion date to be

delayed (Al- Gahtani and Mohan 2007). From above, time overruns is defined as the time increased to complete the project after planed date, which caused by internal and external factors surrounded the project

A lead time is the latency between the initiation and execution of a process. For example, the lead time between the placement of an order and delivery of a new car from a manufacturer may be anywhere from 2 weeks to 6 months. In industry, lead time reduction is an important part of lean manufacturing.

2.29.1. Manufacturing Lead Time

The consequences of construction time delay when undertaking a public sector building project affects all project parties, with issues such as extra cost. Although various methods for mitigating the problem have been developed in the previous studies, the limitation of using these methods raises the concern that probably the causes contributing to the time variance has not been adequately addressed. To investigate the causes, five interview workshops were arranged with relevant personnel in the public sectors. These discussions led to the identification of the following major categories of causes of time overruns (Wang et al 2003).

In the manufacturing environment, lead time has the same definition as that of Supply Chain Management, but it includes the time required to ship the parts from the supplier. The shipping time is included because the manufacturing company needs to know when the parts will be available for material requirements planning. It is also possible for lead time to include the time it takes for a company to process and have the part ready for manufacturing once it has been received. The time it takes a company to unload a product from a truck, inspect it, and move it into storage is non-trivial. With tight manufacturing constraints or when a company is using Just In Time manufacturing it is important for supply chain to know how long their own internal processes take.

Lead time is made of:

- **Preprocessing Lead Time** (also known as "planning time" or "paperwork"): It represents the time required to release a purchase order (if you buy an item) or create a job (if you manufacture an item) from the time you learn of the requirement.
- **Processing Lead Time**: It is the time required to procure or manufacture an item.
- **Post processing Lead Time**: It represents the time to make a purchased item available in inventory from the time you receive it (including quarantine, inspection, etc.)

In more detail, Lead Time terminology has been defined in greater detail. The Supply Chain from customer order received to the moment the order is delivered is divided into five lead times.

- **Order Lead Time** - Time from customer order received to customer order delivered.
- **Order Handling Time** - Time from customer order received to sales order created.
- **Manufacturing Lead Time** - Time from sales order created to production finished (ready for delivery).
- **Production Lead Time** - Time from start of physical production of first sub module/part to production finished (ready for delivery).
- **Delivery Lead Time** - Time from production finished to customer order delivered.

According to the *Rajaniemi Joonas, University of Oulu(2012)-Measuring and Defining Lead Time in a Telecommunication Production,*

Lead Time is a widely used measurement in manufacturing. It tells how much time it takes to start and finish something. Lead Time terms can be seen very differently, depending on personal preferences and work background, which is why these terms were

defined. The scope of these terms is from customer order received to customer order delivered, which is the most vital measurement for any company and solely up to the structure and effectiveness of the firm. Steps from customer order received to delivery received by the customer are represented by five terms.

2.29.2. Relation of Manufacturing and Production Lead Times

Out of the Lead Time terms there are two that have a special relation to each other. These two are Manufacturing Lead Time and Production Lead Time, which both measure the efficiency of production. Manufacturing Lead Time measures exactly the same steps than Production Lead Time but includes also steps before production is started. Production Lead Time on the other hand begins only when the first sub module is started.

Lead time =Fabric manufacturing time+ time to import fabrics+ fabric inspection / other processing + Garments Manufacturing (cutting, sewing, washing, finishing and packing) + Garments Final Inspection and sending to Chittagong sea port + buffer time (woven garments)

Lead time= 25+ 28 +7 + 20+5+5= 90 days

Lead time = manufacturing time of fabrics+ manufacturing time of garments (knit garments)

Method used to calculate the total lead time by calculating individual component in Bangladesh garment is similar to current study and to calculate total lead time of material purchasing process through DTAC to public sector organization in Sri Lanka researcher identified the 13 steps and their lead time.

2.29.3. The Lead-Time Gap

According to the *[John Fernie, Leigh Sparks] Kogan Page ISBN The Lead-Time Gap from - Logistics and Retail Management: Emerging Issues and New Challenges in the Retail Supply Chain*

Lead time gap is the fundamental problem that faces many companies – not just those in fashion industries – is that the time it takes to source materials, convert them into products and move them into the marketplace is invariably longer than the time the customer is prepared to wait. This difference between what might be called the 'logistics pipeline' and the customers' order cycle time is termed the 'lead-time gap'. Conventionally, this gap was filled with a forecast-based inventory – there was no other way of attempting to ensure that there would be product available as and when customers demanded it.

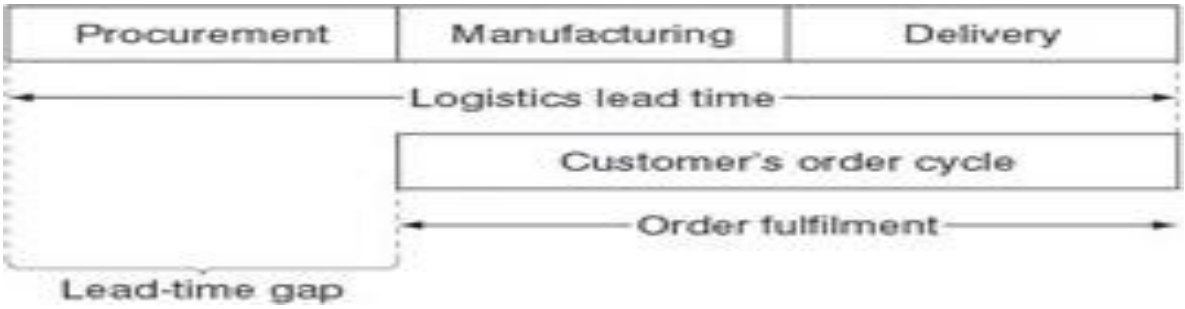

Figure 2-5Lead time gap

2.30. Change of government policies

New policies are often introduced in the middle of a project's construction process, for example, additional safety measures, or new quality monitoring systems. The implementation of new policies will normally involve investment from the project parties. The process of identifying that should take what responsibility in order to implement these policies can substantially delay project progress (Moungrous et al 2003).

Changes in government policies are directly affected to DTAC purchasing process. Mainly the quantity allocation for suppliers restricted time to time policy changers. In the same time government policy effected to reduce the total demand from public sector

organization to DTAC. The policy issues will delay the processing part as well as the approval for allocation.

Ex :- material demanded in end 2017 to fulfill the 2018 uniform requirement not been approved by the treasury and as per the contract suppliers request 150 days from the date of Local letter of credit issued. Due to that, public sector organizations did not receive the good in 2018 and it may deliver to warehouse in mid-2019.

CHAPTER 3

3. RESEARCH METHODOLOGY

3.1. Introduction

This research study is based on the results of the government policy decision to purchase public sector uniform requirements from local textile manufactures through DTAC. The study deliberates the factors contributed to achieve the objective of the government that of empowerment of Local Textile Manufacturers and efficient and effective material supply to public sector organization. Relevant factors are identified as variables leading to achieve the government objective. Mainly there are six variables and one moderator. Those variables are Collaboration, capacity, quality, new technologies, government incentives, acceptance and higher level supervision. The above variables can directly influence for efficient and effective uniform material and the improvements will benefited to minimize the lead time gap and efficient and effective material supply to public sector organization. To measure the above variables indicators have been identified. This study is limited to major textile items relevant to public sector organization, as well as the time gap for delivery. Study more focuses on the military uniform supplies.

3.2. Conceptualization and Operationalization

The framework shown in figure 3.1 had been developed to investigate the primary objectives of this study, which is to identify the influence of six independent variables on performance of efficient and effective material supply and to investigate the moderating impact of higher level supervision on the relationship between the elements and the performance. The concept has to be converted in to variables to measure as there is no way of measuring the concepts. During the literature review researcher explain from where this variable has taken to understand the impact to existing problem. Number of variables; both independent and dependent are used to analyze the data. In the research study, it is expected to prove the hypothesis or to arrives the conclusion with the help of the variables at the end.

3.2.1. Development of Conceptual framework

The conceptual framework has been developed which is depicted by a modal bellow in figure 2.1

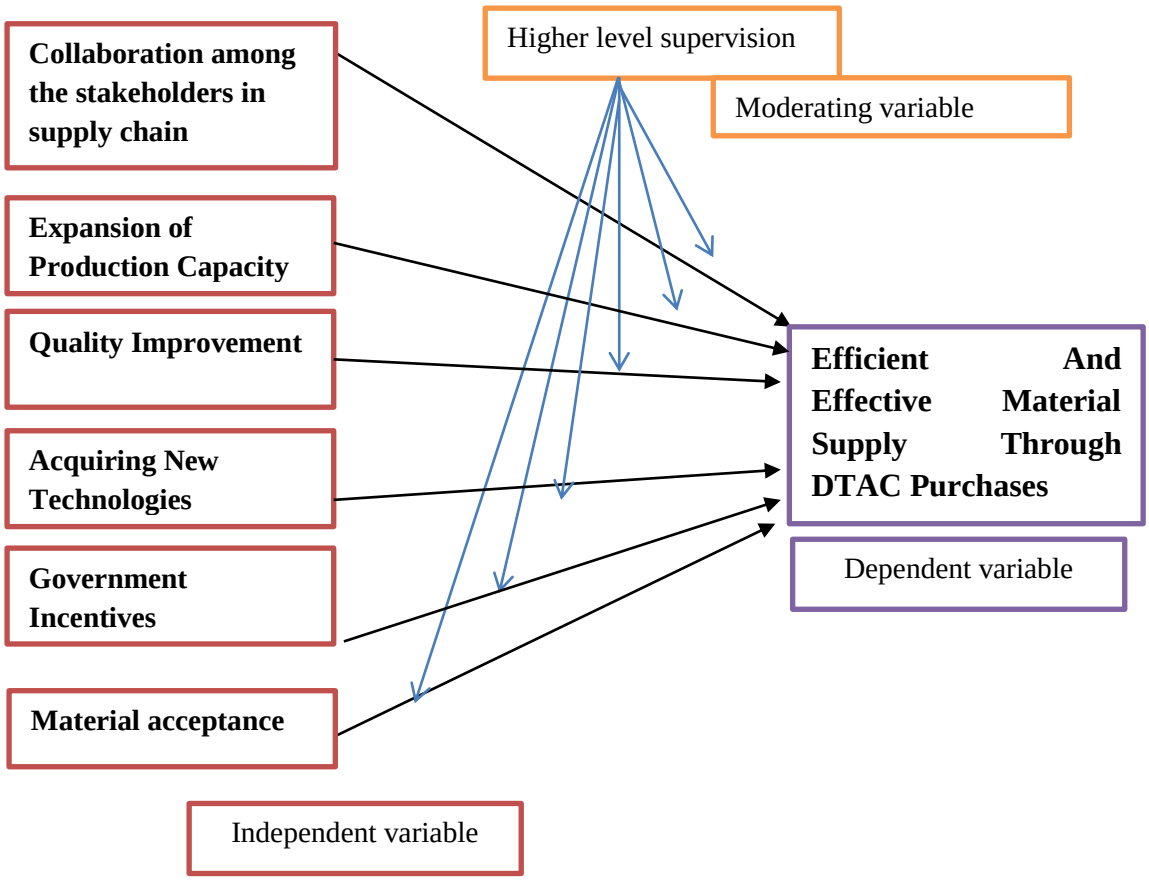

Figure 3-1A conceptual framework of FTAC purchasing process

3.2.2. Dependent variable of the study

In this study **Lead Tim Gap of material supply through Domestic Textile Allocation Committee (DTAC) purchasing** process to public sector organization is considered as the Dependable variable.

3.2.3. Independent variables of the study

The independent variables of this study are as follows.

i. Collaboration among the stakeholders in supply chain

ii. Expansion of production capacity.

iii. New technologies.

iv. Quality improvement.

v. Government incentives.

vi. New material acceptance procedure

3.2.3.1. Direction of Relation

- Collaboration among the stakeholders in supply chain have positive influence on efficiency and effectiveness of material supply.
- Expansion of production capacity, Processing/Production infrastructure have positive influence on efficiency and effectiveness of material supply
- New technologies, have positive influence on efficiency and effectiveness of material supply
- Quality improvement have positively correlated on efficiency and effectiveness of material supply
- Government incentives , protectionism to investment flow have positive influence on efficiency and effectiveness of material supply
- Lapses in material acceptance procedure, incompetency and unskilled human resource have negative influence on efficiency and effectiveness of material supply

3.3. Questioner designing and Pilot study

A questionnaire was developed to assess the perceptions of respondents regarding effectiveness and efficiency material supply through DTAC. Factors influencing efficient and effective material supply were first examined and identified through a relevant literature review and by conducting a pilot study that sought advice from experienced practitioners. Considering the conditions and circumstances related to efficient and effective material supply through DTAC, respondents were asked to give their perception regarding reason behind inefficiency and lack of effectiveness of DTAC procurement and probable solutions to improve DTAC procurement performance.

These structured questionnaires should be based on a carefully prepared set of questions piloted and refined until the researcher is convinced of their validity. Therefore the pre-testing is an important stage in the questionnaire design process, prior to finalizing the questionnaire. It involves administrating the questionnaire to a limited number of potential respondents and other knowledgeable individuals in order to identify and correct design flaws. For this research an English version of questionnaire was tested in order to make sure that the questions were easily understood. The test was made by distributing five drafts questionnaire among high officials, such as, Arm Officers, textile quality expert, DTAC members of this process. The test enabled the researcher to remove any items that will not produce any usable data. Pilot investigation also helped to assess the adequacy of the research design and the instruments to be used for data collection. In general, the experts agreed that the questionnaire is suitable to achieve the goals of the study.

3.4. Purpose of the study

Umasekan and Bougie (2010) classify the purpose of research study to be the nature of either exploratory, descriptive or in a form of hypothesis testing. Further it is revealed that the nature of the study depends on how far the researcher who conduct the study is familiar with the topic of interest, nature of the research problem and economic consideration, the type of the studies can be summarized as follows.

a. Exploratory studies provide insights into the problem at hand by narrowing down an issue of broader scope. These studies help in clarifying concepts which may carry out different meanings under different scenarios, develop hypothesis via literature review and avoid ideas that are not practical to the examined.
b. Descriptive research focuses on describing the characteristics of the population being studied and mark prediction which are specific to the entire population. These studies can be either longitudinal or cross sectional
c. Hypothesis testing explains relationship which exist between one or more variables and can be performed with both qualitative and quantitative data , (Umasekan & Bougie 2010)

This study can be classified as an explanatory (descriptive) study in which , the impact of one variable on the other of interest, the six element and efficient and effective material supply are examined. Hence this quantitative study primarily focuses on identifying and evaluating the influence of six elements and efficient and effective material supply through DTAC.

The hypothesis testing assists in better understanding the relationship which exists between the variables.

3.5. **Type of investigation**

There are two investigation types which can be used to address a research issue in hand. Firstly, the causal investigation deals with establishing a definitive cause and effect relationship, where one variable results in a certain effect on the other variable (Umasekaran & Bougie 2010). Secondly, the correlational investigation focuses on identifying the variables which are likely to associate with the research problem. The type of investigation of this specific study is correlational, in which data is collected in order to determine if the two constructs studied are related. In this case it can be stated that, the seven elements (independent variable) causes efficient and effective material supply (dependent variable). The researcher will examine on souses of higher level supervision with variables.

3.6. Extent of researcher interference with the study

This element analyses the extent to which the researcher interfere with the normal work flow. It is **said** that there will be minimal interference when it comes to a correlational study since it is conducted in the natural environment (Umasekan & Bougie 2010). However, in the case of cause and effect relationships, the work flow will experience more interference as the researcher will purposely change certain variables in order to study the effect of changed variables. Umasekan and Bougie (2010) had identified three varying degrees of interference - minimal, moderate and excessive. This study was aimed at determining the influence of six elements on efficient and effective material supply through DTAC, in which data was collected in the natural environment. Hence there was only minimal interference with the normal flow of work (Umasekaran & **Bougie** 2010). Interference occurred during filling of the questionnaires by the relevant officers but is far less than conducting a causal study which involves greater interference. As far as this particular study is concerned, data was collected from officers of various manufacturing firms operating in local textile industries in **Sri** Lanka in the form of a questionnaire. The data collected was then analyzed **in** order to solve the problem statement as stated in early chapters. Hence, minimal interference was experienced to the normal work of these firms.

3.7. Study Setting

According to Umasekan & Bougie (2010), 'research can be done in the natural environment where work proceeds normally: noncontrived setting or in artificial, contrived setting'. In general correlational studies are being conducted in noncontrived settings while causal studies are most likely to be done in a contrived setting. This study is done in a noncontrived setting, where work is being done in the normal procedure. This can be further supported by the fact that the study is correlational and there is minimal researcher interference as explained earlier. Since this study is correlational and hence is based on organizational level, it can be classified as a field study (Umasekaran & Bougie 2010).

3.8. Unit of Analysis

According to Umasekaran and Bougie (2010) unit of analysis refers to 'the level of aggregation of the data collected during the subsequent data analysis stage'. In general, unit of analysis is determined by the research question and is examined under different units of analysis: individuals, dyads, groups, organizations and cultures. Since the problem statement of this research aims at identifying if there is an influence of independent variable on efficient and effective material supply from domestic textile manufacturing firms in Sri Lanka, the unit of analysis in this case can be identified as individual manufacturing firms.

3.9. Time Horizon

Umasekaran and Bougie (2010), classif' the time horizon of a research under (1) cross sectional and (2) longitudinal Cross sectional studies deal with collecting information and data from a representative sample only once. Here the researcher may draw one sample of respondents (single cross sectional) or two or more samples (multiple cross sectional) depending on the problem to be addressed. In contrast, in longitudinal studies the sample of the population is measured repeatedly though the sample remains the same over time. The sample can be measured repeatedly in terms of the same variable (true panel) or different variables (omnibus panel). This research can be classified as a cross-sectional study in which data was gathered only once, but over a period of time. Some of the common advantages of conducting a cross sectional study are: the sample being more representative and produce fewer errors when compared to longitudinal studies (Umasekaran and Bougie 2010).

3.10. Hypothesis of the study

Research hypothesis are describe at chapter 1.8

3.11. **Research methodology**

This Study applies a mix methodology to eliminate weaknesses of both qualitative and quantitative data in the research. This is basically survey base case study and the popular non probability sampling technique call purposive sampling method sued to collect the data & information from a specific target group relevant to current study. Researcher used Judgments sampling technique comes under purposive sampling method to collect the information from most advantageous and specific target group such as SLITA, DTAC, TEC, Domestic textile Manufactures, SLAF and other public sector organizations. The Current study is focus to specific area and only some people knowing the intended information relevant to each step in DTAC purchasing process. Therefore, researcher uses judgment sampling technique to collect the data from most advantageous people and places. The selection criteria were based on the number of officials engaging with the existing process and 35 respondents were selected as a sample. A number above 30, according to sekaran, (2003) is acceptable. This study, domestic textile industry is mainly divided in to two specific area call weaving and grey processing. So, when selecting samples, researcher used quota sampling technique also to make sure that weaving and grey processing manufactures are adequately represented.

Due to resource constraints, proposed survey was limited to four factories where two factories from weave and process category and the other two factories from grey fabric import and process category. The purpose of this sample was to employ a case study to observe effectiveness of the entire scheme launched by the government. Primary data were collected by means of conducting interviews and administering questionnaires. Secondary data was collected from Ministry of Industry and commerce, purchasing institutions and suppliers. Those data will be analyzed qualitatively as well as the quantitatively.

In the literature review researcher go through entire purchasing process to find the reasons for this inefficient and ineffective material supply to public sector organization and reasons for long lead time. Depth study was carried out with selected factories with a view to see how far public sector organization can minimize the lead

time and plan the efficient and effective receipt of items within the delivery period mentioned in the contract agreement.

In addition to that, researcher adopted likert five point rating scale of 1,2,3,4 and 5 was use to analyses respondent in the questionnaire. The Questionnaire was circulated among the sample selected under judgmental sample selection method. Same data will be analyzed using IBM SPSS software. To test the reliability of the questioner Cronbach's alpha value was obtained and Kline (1999) noted that although the generally accepted value of 0.8 is appropriate for cognitive tests such as intelligent tests , for ability tests a cut-off point of 0.7 if more suitable. He goes onto say that when dealing with psychological construct values bellow even 0.7can, realistically, be expected because of the diversity of the constructs being measured. Multiple regression were used to verify results and arrive at certain conclusions to see the relationship and appropriate statistical manipulations will be done for hypotheses testing.

3.12. **Research design**

This case study is planning according to the following scientific research design and the basement of this case study setup according to the following similar process. And modal develop by the researcher is as appendix "F"

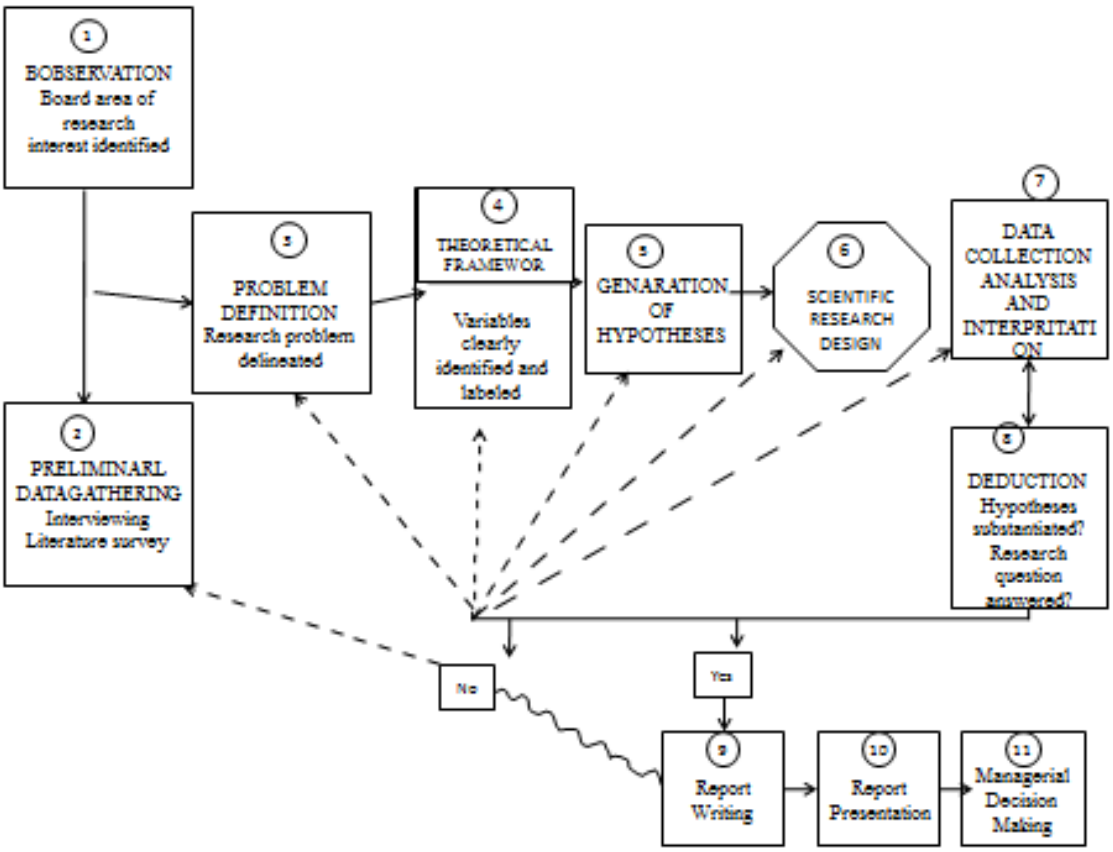

Figure 3-2 research design

3.13. **Population and Sample Selection**

The data source has chosen carefully to ensure that it can address the study question, that it has a sufficient number of observations, that key variables are available. For necessary data and information for the study, both primary and secondary sources are used. Both qualitative and quantitative approach has been used to understand the perception of participants in regarding to existing performance of DTAC procurement and find out the possible ways for improvement.

3.13.1. Population

Umasekaran & Bougie (2010) defined population as 'the entire group of people, events or things of interest that the researcher wishes to investigate'. The population of this study is all domestic textile manufacturing firms, Public sector organization, Supporting Agencies including government representatives those who operate in DTAC purchasing process in Sri Lanka. According to statistics (DTAC suppliers registration 2017) there are less than 20 domestic manufacturing firms operating under the DTAC in Sri Lanka. Due to certain limitations as presented above, a representative sample of 6 of the textile manufacture and 29 other stakeholders were selected to distribute research questioner number one of this study. The target respondents were either, Chairman DTAC, Secretaries, General Managers, Logistic officers of try services, technical officers of each of the manufacturing firms and testing institutions.

3.13.2. Sample size

Wood and Haber (1998) defined the sampling as the process of selecting representative units of a population for the study in research investigation. A sample is a small proportion of a population selected for observation and analysis. The samples were selected randomly giving representatives to all stakeholders of DTAC process.

The sample has to represent the population or it is assumed that the sample result relates to the entire population. Once sample is selected, population has to be selected out of the selected sample. When textile manufacturers are concerned their contributing factors towards development of the industry are almost similar. These contributing factors are capacity expansion, investments, introducing new technologies, increasing infrastructure facilities and number of machines, employment of labor, quality development, value addition, saving of foreign exchange. Those contributing factors of the sample would indicate the development of the industry. One factor that would different from manufacturer to manufacturer is management style. Sampling techniques provide range of methods which is able to reduce the amount of data which need to collect. Selected sample would give a conclusion about the entire population. Mainly sampling methods

are classified as either probability or non-probability. During this study researcher used one of Non Probability sampling technique call Purposive Sampling method to collect the data relevant to study. **Using both Judgment Sampling and Quota Sampling technique comes under purposive sampling**, researcher gathered information from specific target group such as SLITA,DTAC,TEC, Domestic textile Manufactures and SLAF by allocating quota for each segment**. This case study is focus to specific area and only some people know the intended information relevant to each steps in purchasing process.** Therefore researcher used Judgment sampling technique to collect the data from most advantageous people and place such as DTAC, SLITA, TEC, SLAF officers and etc. This study area is mainly divided to two specific area call weaving and grey processing. So researcher selecting sample implementing Quota sampling technique to make sure that weaving and grey processing manufactures are aggregately represented. In the manufactures side, the entire population of this study is small where nearly 20 local textile manufactures participated to the scheme of supplying uniform material to the government under weave and finish locally or grey import and finish locally.

The local textile manufactures registered under this scheme supply uniform materials to Armed Forces, Police, Schools, Prison, Civil Security Department and STF. Some of them are knitters and others either weave and supply or grey cloth import, process and supply. Some manufactures do not possess entire processing facility. Any manufacturer who does not possess a facility other than the main facility of weaving or processing, could outsource such facility from outside.

When selecting the sample more weight age has been given for the four major uniform material suppliers. The selected four suppliers represent both category of uniform manufacturing that of weave and process and grey import and process. Following suppliers are supplying more quantity of material requirement of Sri Lanka Air Force and selected suppliers manufacturing textile material for all other public sector organization such as Arm Force, Education department, Prison, National Cadet Coup and etc.

In the research, the data will be collected in a survey by questionnaires from selected respondents. Also, the statistics and figures are obtained by field work and

hidden observations. The population of this study is executives of all DTAC registered textile manufactures, Public Sector Organization and government bodies from whom researcher can easily obtain his required data for study.

Due to time constraints, researcher only considers 4 factories in Domestic Textile Industry. For this, convenience sampling technique of non- probability method has been used.

These tools for data collection are used in this research:

Questionnaire no1

Field work and hidden observation

Direct Interviews

To gathering data, researcher used personal contact (Face to Face), explore primary and secondary data, interviews of respondents, go to different organizations for collecting statistics, and watch and read electronic and print media news; Journals ,Tender Document, Tender Minute, contract agreement, order forms and etc.

Two constructs have been considered efficient and effective supply of textile material for public sector organization in Sri Lanka in order to carry on this particular study. 35 no of stakeholders which have already take participation for this DTAC purchasing process in the Sri Lankan were selected covering a variety of sectors including manufactures , public sector organization , DTAC , Ministry , SLITA and other. Out of 35 selected samples 32 were responded for the questioner number 01.

3.14. Data Collection Methods and Techniques

I. Exploratory pilot interviews were conducted with DTAC members, in charge officers of purchasing institutions, technical experts of SLITA managing directors of the manufacturing companies. Pilot interviews were conducted base on the set of free- structured question for pilot interview is depicted in appendix "B"

II. **Questionnaire design**- A questioner was developed to assess the perceptions of respondents regarding effectiveness and efficiency material supply through DTAC procurement process and causes and effects in DTAC procurement process. Factors influencing time and cost overruns in DTAC procurement process were first examined and identified through a relevant literature review and by conducting a pilot study that sought advice from experienced practitioners. Considering the conditions and circumstances related to DTAC procurement process, respondents were asked to give their perception regarding reason behind inefficiency and lack of effectiveness of DTAC procurement process and probable solutions to improve performance of DTAC procurement.

Questionnaire content- The questionnaire included two parts that related to the factors affecting the efficiency and effectiveness of DTAC procurement process. These parts are general information of the respondents, opinions regarding DTAC procurement process, seven factors influencing efficiency and effectiveness of DTAC procurement (collaboration. Capacity, technology Quality, government incentives, acceptance and moderate variable of higher level supervision). In first part, seven questions were prepared asking for general information about respondents such as the name, designation, work experience and procurement experience. Second part of questionnaire consists of 60 question; identified from the literature review, influencing efficiency and effectiveness of DTAC procurement. (The questionnaire is included in appendix -C)

Pilot study - These structured questionnaires should be based on a carefully prepared set of questions piloted and refined until the researcher is convinced of their validity. Therefore the pre-testing is an important stage in the questionnaire design process, prior to finalizing the questionnaire. It involves administrating the questionnaire to a limited number of potential respondents and other knowledgeable individuals in order to identify and correct design flaws. For this research an English version of questionnaire was tested in order to make sure that the questions were easily understood. The test was made by distributing five drafts questionnaire among high officials, such as, Logisticians, Fabric quality inspectors and Suppliers in DTAC process. The test enabled the researcher to

remove any items that will not produce any usable data. Pilot investigation also helped to assess the adequacy of the research design and the instruments to be used for data collection. In general, the experts agreed that the questionnaire is suitable to achieve the goals of the study.

Allocation of questions to each independent variable, moderate variable and Dependable variable of this study have been done in a scientifically accepted method laid down in Article peng 2009 page no 593. The develop diagram attach as appendix "D"

III. In finding necessary information visits will be made to purchasing institutions and 4 suppliers (factories) to obtain the secondary information. Examine the production process in the factories also could gather necessary information relevant to the topic. Questioner no 2 attached as appendix "E"

Table 3-1Details of the information and interviews

S/N	Category/ position	Number	Method of data collection
1.	Weavers (full process)	03	Questionnaire and Interview
2.	Processors (Grey import and process)	03	
3.	SLITA Director	1	Questionnaire Interview
4.	Director Logistics (SLAF)	1	
5.	SO LOG IV (SLAF)	1	
6.	CPO , OIC Tender (SLAF)	2	
7.	CO S&MD , CO EP&AU (SLAF)	2	
8.	Director , department of textile industry	1	
9.	Textile Technologist SLITA	2	
10	Army officers	3	
11	Navy officers	2	
12	Police department	2	
13	SLSI	1	
14	STF	2	
15	CS Department	2	
16	NCC	1	
17	Suppliers Representatives	1	
18	Chairman DTAC	1	
19	CFO MIC	1	
20	DDL AF	1	
21	Chairman TEC- MIC	1	
22	Former Director C Of S SLAF	1	

3.14.1. Collection of Primary and Secondary data

(a) Collection of Primary Data

- Interviews with the officials of the procuring entities. These officials consist of Director Logistic of SLAF ,CPO, CO S&MD and Staff Officer Logistic IV
- Scheduled interviews with officers of SLITA, Textile Technologists, Inspection Officers and managing directors of manufacturing companies.
- Circulation of the questionnaire among the major uniform suppliers to collect data about machine capacity, new technologies, employment generation, utility services Etc.

(b) Collection of Secondary Data

- Document related to order confirmation , Contract agreement Available at PD SLAF
- Bidding documents
- Minutes of the DTAC
- Cabinet memorandums
- Documents in respect of annual uniform material requirements placed with DTAC by respective purchasing agencies.
- Reports of technical evaluation committees
- Minutes of progress review meetings of DTAC
- Annual budget estimates and appropriation accounts in relation to the purchasing agencies
- Test reports issued by SLITA

3.15. Method of Data Analysis

The SPSS software was used to analyze the data collected via different sources. Researcher use the IBM SPSS software to check the reliability of the questioner and data collected, frequency test conducted to see the response rate of each question. In the same time correlation coefficient analysis and multiple regression analysis conducted to see the relationship in between each independent variable vs dependable variable. In addition tables and charts were used to present the data analyzed in an orderly manner.

Capacity improvement could be ascertained by taking the information of number of workers, number of meters woven, number of machines installed in each year. Verification of those information could be done by relevant documents at Ministry of Industry & Commerce, examining factories, purchasing institutions, and SLITA. This would help to identify any malpractice when supplying imported materials pretending as locally manufactured materials. The analyzed data will be presented in understandable manner, in the form of graphs, percentages, tables, charts, diagrams and annexure so that any reader make a conclusion on the research findings. The interpretation or views of the parties who provide the information will be presented with my interpretations.

3.16. Validity

Validity is the ability of an instrument to measure what it is intendant to measure. **Sumith, 1991.Degree** to which the researcher has measured what he has set out to measure. **Kerlinger 1973**. Are we measuring what we think we are measuring?. **Bobbie 1989**. Extent to which an empirical measure adequately reflect the real meaning of the concept under consideration. The validity can be describe as following type.

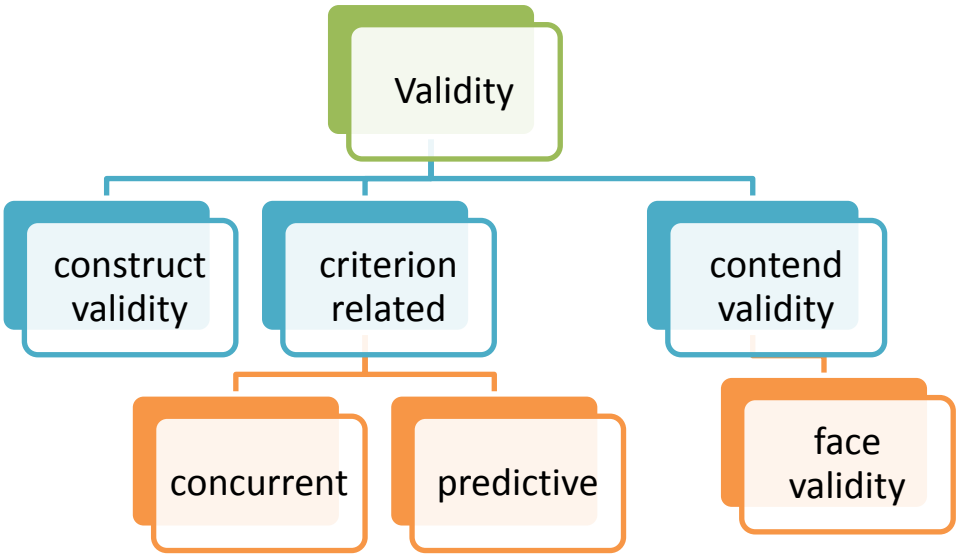

Figure 3-3validity chart

- Criterion-related validity (The measuring instrument is call "criteria" .The measuring instrument accurately predict behavior or ability in a given area. There are two types)
    - Predictive validity(If the test is use to predict future performance)
    - Concurrent validity (if the test is used to estimate present performance or person's ability at the present time not attempting to predict future outcome)
- Construct validity (assesses the extent to which a measuring instrument accurately measures a theoretical construct it is design to measure. High degree of correlation between responses from different sources)
- Content validity (Extent to which a measuring instrument covers a representative sample of domain of the aspects measured. Each aspect should have similar and adequate representation in questions)
    - Face validity (each question or item on the research instrument must have a logical link with the objective)

3.17. Reliability

It is the ability of an instrument to create reproducible result. Questionnaire is said to be reliable if we get similar or same answer repeatedly. Though it cannot be calculated exactly, it can be measured by estimating correlation coefficients. Reliability of data includes Consistency and Stability.

Internal Consistency

- How well items in a set hang together
- Cronbach's alpha determines consistency
- Shift-half reliability can also determine consistency

Stability

- Parallel form (high correlation between similar groups)
- Test-retest reliability (same tests conducted at different time)

Equivalence

- Use two observer study a single phenomenon simultaneously
- Inter – rater reliability

Out of the above researcher used Cronbha's alpha to determine the reliability of the questioner

3.18. Qualitative analysis

In order to satisfy the objectives of the dissertation, a qualitative research was held. The main characteristic of qualitative research is that it is mostly appropriate for small samples, while its outcomes are not measurable and quantifiable. Its basic advantage, which also constitutes its basic difference with quantitative research, is that it offers a complete description and analysis of a research subject, without limiting the scope of the research and the nature of participant's responses (Collis & Hussey, 2003).

However, the effectiveness of qualitative research is heavily based on the skills and abilities of researchers, while the outcomes may not be perceived as reliable, because

they mostly come from researcher's personal judgments and interpretations. Because it is more appropriate for small samples, it is also risky for the results of qualitative research to be perceived as reflecting the opinions of a wider population (Bell, 2005).

3.19. Quantitative analysis

Under the Quantitative analysis, the measures of central tendency (mean, median and mode) and measures of dispersion (standard deviation, variance and range) and etc will be used as per the data received.

3.20. Report writing

Collected and considered facts are stated in report to give clear and concise information about the subject matter of the report. Collected data interpreted into the findings. The report is composed of chart, graph, statics and verbal statement of findings. Microsoft Word and Excel have been used for writing the report. The dissertation has been written in English in A4 sized paper with 1.5 line spacing. 'Times New Roman' font has been used in writing the report.

3.21. Summary

In this chapter the research methodology has been described. It includes research design, method that samples were selected, what is the population, variables, and indicators data collection method, data analysis. The methodology further describes through conceptual framework which consist of SIX independent variables, moderators and indicators there to and the measurements. Software going to be utilized for advance analysis.

CHAPTER 4

4. DISCUSSION AND ANALYSIS

4.1. Introduction

This chapter elaborates the discussion and analysis of primary and secondary data. Researcher develops his second questionnaire based on the literature review to get information from the manufactures to find the reasons why DTAC fails to deliver the textile material efficient and effective manner. A first questionnaire developed base on likert scale to find the significant level and level of impact on variable and efficient and effective supply of uniform material through DTAC. In addition, material purchase in year 2013 and 2018 from DTAC purchasing process and SLAF procurement process were consider showing actual lead time gap. Series of scheduled interviews were held with four uniform manufacturers, members of the DTAC, officials of the SLITA, SLAF Officers and other purchasing institutions to find methods to minimize the time period taken to complete their particular task. The researcher visited factories to see the possibility of reducing of production lead time in each steps in production process. Production process was carefully studied to identify the development trend of the manufacturers. Production capacity development, Improvement of specification leading to the quality development, introduction new technologies, employment of labor, and quantum of local value addition was carefully studied and analyzed.

During the study, researcher critically analyze all the steps (beginning to end) of the textile material purchasing process and each steps and time allocated for completion of particular steps have considered to find the reasons for lead time gap of uniform material supply through Domestic Textile Allocation Committee to public sector organizations. The public sector organizations are included with large number of organizations and area is very vast. Therefore, this study area was narrow down to SLAF, and researcher only considered the material purchases for them since year 2013 and 2018 to find the reasons for lead time gap.

Basically, the material purchases from DTAC can be summarized in to 13 steps as mentioned bellow and each steps involved with deferent parties. Individual time consumption of each step will be effected for total lead time of the process.

4.2.**DTAC Purchasing Process**

Table 4-113 steps in DTAC process

S/ N	Steps	Nu of days	Acc dates
1	DTAC Request forth coming year clothing items from public sector organizations and they have to provide the same.	30	30
2	Appointing of TEC including representatives from public sector organization	14	44
3	Preparation of annual demand for forthcoming year & get approval from TEC and then DTAC	21	65
4	Invitation of bids from DTAC registered suppliers	14	79
5	Bid opening and Scheduling of quotations at DTAC	14	93
6	File released for evaluation and Sample send for testing at SLITA	30	123
7	Evaluate of tenders , capacity analysis by SLITA technicians, price negotiation, and allocation of material	45	165
8	Respective Ministers approval and CTB approval	60	228
9	Document H/O respective services (tender approval letter, Bid bond , sample and SLITA test reports)	21	249
10	SLAF issue a letter of award to manufacture and request performance bond , obtaining of proper sample and colour matching	30	258
11	Signing of contract agreement Order confirmation and opening of Local LC	30	288
12	Manufacturing process and Item Delivery to SMD as per the agreement and given schedule	90	408
13	Quality acceptance & item BOC process at SMD and confirmation of acceptance to bank and the supplier	21	429

To compare lead time gap between SLAF procurement process and DTAC purchasing process, researcher gone through last two years purchases of SLAF procurement cycle. The SLAF purchasing procedure can be summarized in to 13 steps and every steps has lead time to complete the task. In this process, time consume for each steps determined the total lead time of purchases.

4.3. **SLAF Purchasing Process**

Table 4-2 13 Steps in SLAF Purchasing process

Step Number	Steps	Number of days	Accumulated dates
1	Preparation of demand with a proper specification after checking the S&MD stock and future consumption	7	7
2	Demand is Approved by staff officer , DL and demand send to quotation cell	3	10
3	Invitation of bids as per SLAF bidding methods , opening of physical tender file and subsequently appointing of TEC	21	31
4	Bid opening AND Scheduling at PMO	4	35
5	File out for Chairman TEC for evaluation with the available samples	14	49
6	Material sample testing at SLITA or SLIS	14	63
7	Tender file forwarded for Directors recommendation DPC major Approval	7	70
8	Respective Ministers approval and CTB approval F-136 approval from MOD. Order commitments and fund allocation	7	77
9	Issuing of letter of award to supplier and request performance bond of 10%	7	84
10	Checking the validity of performance bond and Signing of contract agreement and Order confirmation	7	91
11	Manufacturing of items as per SLAF specification and delivered to S&MD	90	181
12	Quality acceptance after testing of sample obtained from the delivered material at SLITA	18	199
13	BOC process at SMD clothing group	4	203

Bellow line charts shows the lead time gap of DTAC purchasing (scheduled) compared with SLAF process (scheduled)

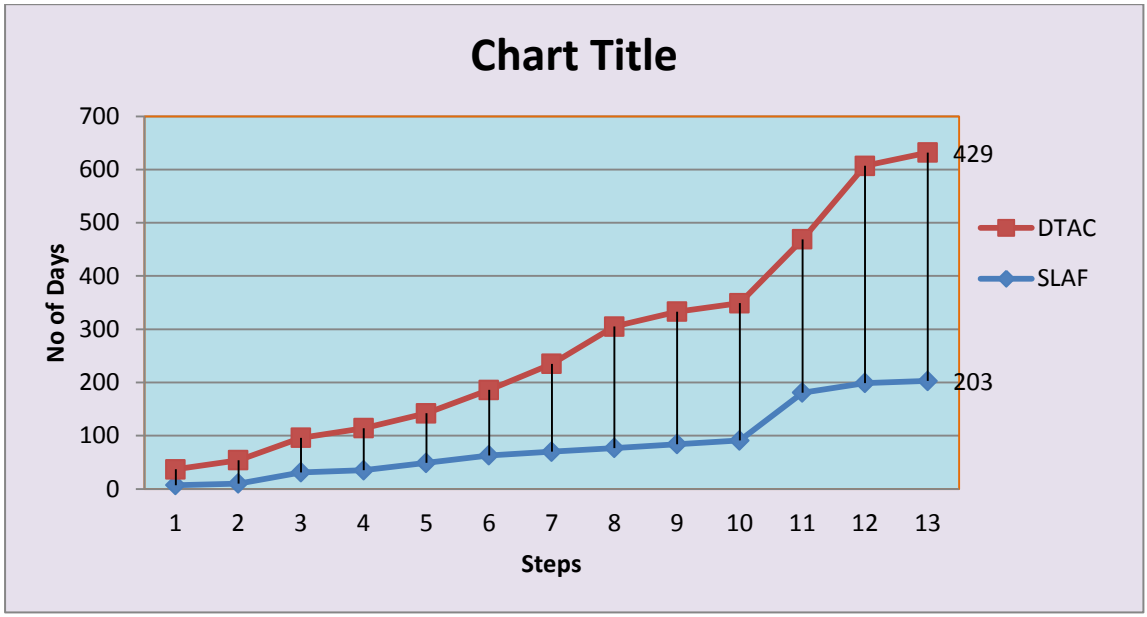

Figure 4-1Lead time gap of DTAC process and SLAF process

Approximate time allocated for individual steps in both process have mentioned above and what researcher observed during this study is that, the time allocated for 13 steps and time taken to complete particular task depends according to the situation. However, DTAC process is a combined task and many public sector organizations, number of domestic suppliers and controlling authorities are working together to complete the task. The failure of one entity will effected to delay the entire process. Due to limited time and limited resources, researcher only considers the material purchasing through DTAC to SLAF since year 2014. It is similar to the other public sector organization too. Data and information related to each purchase mentioned bellow shows how the lead time gap is generated. The total lead time gap can be minimized only reducing the lead time of individual steps. To minimize the lead time gap, stakeholders have to work together in more responsive manner.

As per scheduled, in DTAC process material to be delivered to S&MD Katunayaka within 429 days to issue material to run SLAF garment factories without machine idling situation. Parallel to the DTAC process, Researcher go through the

SLAF purchasing process to determinants of lead time gap of SLAF purchase process and during the study researcher found that approximately 203 days to deliver material. Data gathered from DTAC process and SLAF purchasing process has been analyzed to determinants of lead time gap of individual steps in DTAC and SLAF purchasing process.

Annually, SLAF have to purchase uniform material to stitching of uniform required to cater annual kit issues of Airman. As per government instructions, SLAF have to purchase material from DTAC to empower Domestic Textile Manufactures. SLAF purchased 12 types of uniform material in year 2014 through DTAC and Lead time of each steps in DTAC purchasing process with related to each type of material can be summarized as follows

4.4. Purchasing of material from DTAC to SLAF Since 2014 to 2018

Through the secondary data collected from DTAC annual report, Tender minutes and contract agreement available, researcher will analyze the yearly purchases and the actual lead time of each purchases to prove that there is a lead time gap of DTAC purchases.

4.4.1. Purchase of Uniformed Material through DTAC in year 2014

Table 4-3- Time taken by DTAC to deliver material in 2014

Step Number	Number days of days	Accumulated dates	Camouflage	Single Jersey	PT T-Shirts White	Grey Sheeting	Khaki Drill	Polyester/Cotton (Air Force Blue)	Polyester/Cotton (Dark Blue)	PT Short White	Blue Drill (PT Short	Polyester White (Yellow Line)	White Drill Material	Polyester/cotton white
13	429	429	429	429	429	429	429	429	429	429	429	429	429	429
Total time taken for each purchases			**535**	**668**	**527**	**514**	**549**	**514**	**514**	**576**	**623**	**521**	**547**	**541**
GAP from scheduled date			106	239	98	85	120	85	85	147	194	92	118	112

Bellow line chart demonstrate the lead time gap of camouflage, single jersey and PT T shirt (only taken three materials) compared with scheduled date of process (2014)

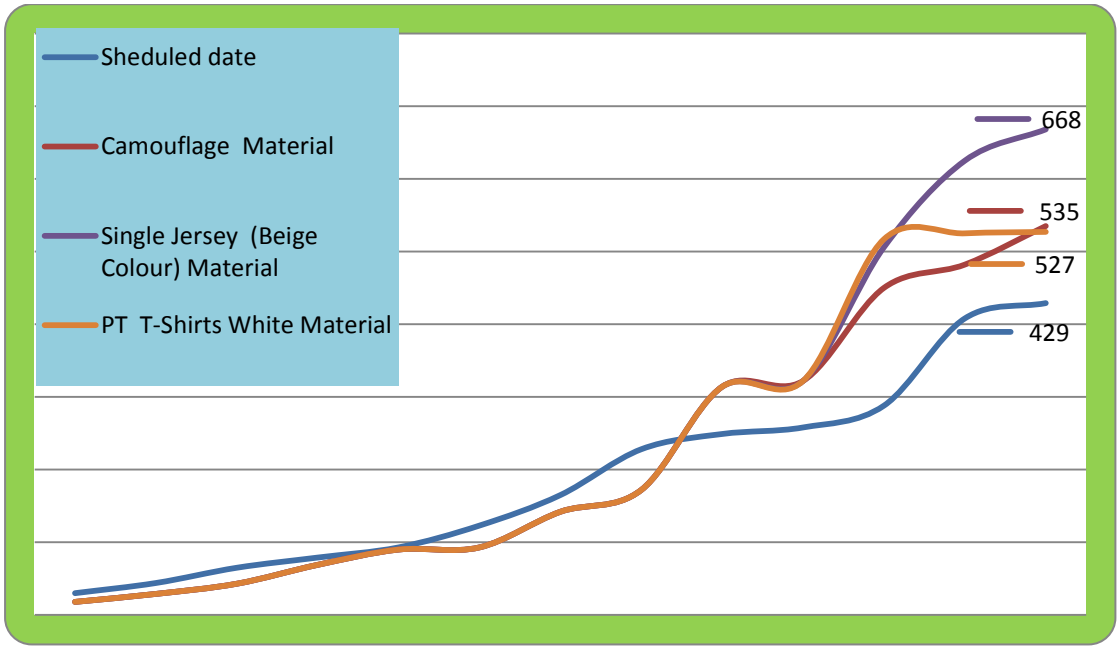

Figure 4-2Lead time of DTAC purchases and scheduled time 2014

As per year 2014 purchase details mentioned in above schedule, DTAC suppliers have to deliver textile material to SLAF stores within 429 days. However, actual time spends to deliver the material by DTAC suppliers are par away from scheduled. As per the above delivery details Single Jersey (Beige Colour) Material received to S&MD clothing group after 668 days and 239 days from the scheduled date. Blue gray PT short material received to S&MD after 623 days and 194 days after from the scheduled date. No one is able to deliver the material on time to S&MD Stores to issue for SLAF garment Factories to stitching of uniform required for Annual Kit Issue. This situation creates stock out environment at S&MD and Stock out situation of material at SLAF stores will collapse the production lines of SLAF garment factories too. In the same time stock out situation will effect for annual kit issues of SLAF personnel. To face for stock out situations, SLAF has to maintained buffer stock by increasing safety stock of clothing material in S&MD clothing group. Maintaining of additional stock at S&MD is not a good inventory management system and it is very risky and vesting of public money.

4.4.2. Purchase of Uniformed Material through DTAC in year 2015

Table 4-4 Time taken by DTAC to deliver material in 2015

Step Number	Number of days	Accumulated dates	Camouflage Material	Single Jersey	PT T-Shirts White		Grey Sheeting	Khaki Drill Material	Polyester/Cotton (Air Force Blue)	Polyester/Cotton (Dark Blue)	PT Short White	Blue Drill (PT Short)	Polyester White (Yellow Line)	Polyester/cotton white	Pajama material	Single jersey white louse	Polyester cotton blue
13	21	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429
Total time taken for each purchases			677	613	612	597	526	671	555	577	579	547	532	563	512	514	528
429			248	184	183	168	97	242	126	148	150	118	103	134	83	85	99

Bellow line chart demonstrate the lead time gap of seven items purchase from DTAC compared with scheduled date of process (2016)

Table 4-5 accumulated Time taken by DTAC to deliver material in 2015

Step Number	Accumulated dates	Camouflage Material	Single Jersey	t shirts	Grey Sheeting	Khaki Drill Material	(Air Force Blue)	(Dark Blue)	PT Short White
1	30	16	16	16	16	16	16	16	16
2	44	20	20	20	20	20	20	20	20
3	65	31	31	31	31	31	31	31	31
4	79	37	37	37	37	37	37	37	37
5	93	58	58	58	58	58	58	58	58
6	123	66	66	66	66	66	66	66	66
7	165	119	119	119	119	119	119	119	119
8	228	169	169	169	169	169	169	169	169
9	249	374	374	374	374	374	374	374	374
10	258	400	400	400	400	400	400	400	400
11	288	503	503	468	469	503	503	443	504
12	408	653	592	588	512	657	548	563	558
13	429	677	613	597	526	671	555	577	579

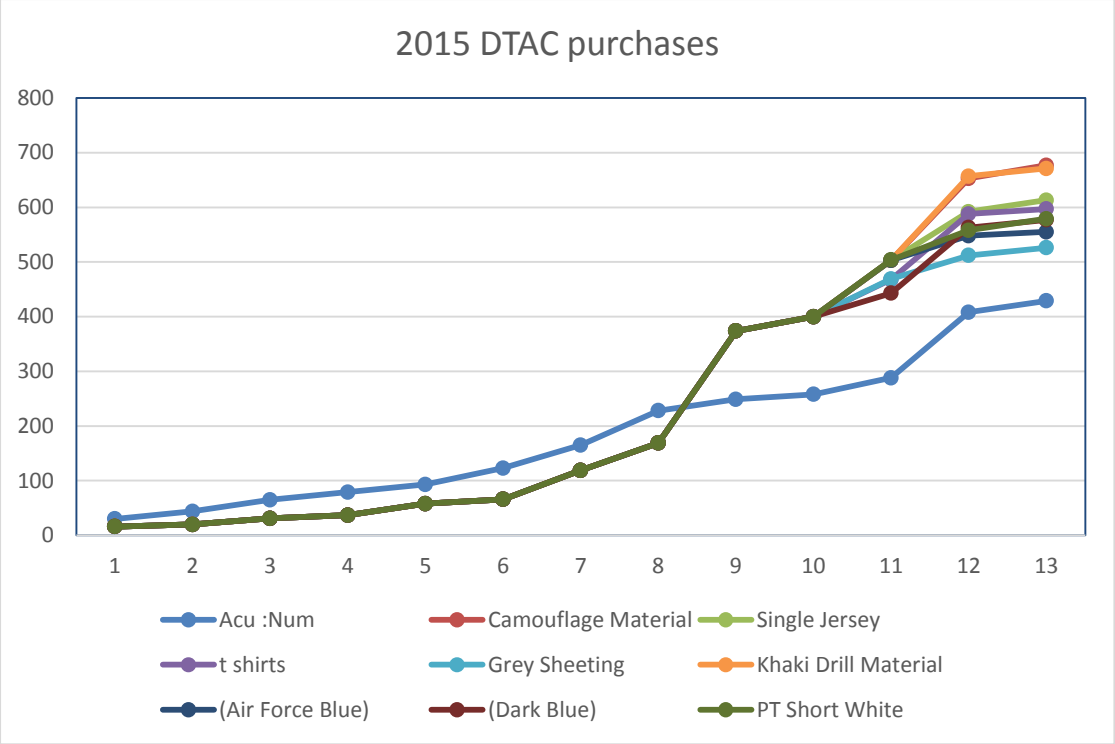

Figure 4-3Lead time gap of DTAC process and SLAF process 2015

As per above detail, out of 16 types of material no material was received within 429 days. Fist lot received within 512 days with 85 days gap. Final lot received after 677 days and lead time gap from the schedule is 248 days. It is very clear that, item has not received within scheduled date. More time consume for step number one to step number 11, no production or authority to start the production up to this level. So it is very clear that the delay is not in the manufactures hand. As per the scheduled manufactures have to complete their task within 90 days of local letter of credit issue date in some special cases it has extended to 150 days considering the quantity to be manufacture. In this case only three manufactures taken more than 100 days for the completion of manufacturing task, camouflage 150 days, khaki 154 days and dark blue material 120 days. Other than that all the suppliers delivered the material less than 100 days. If Respective public sector organization is having a keen interest, the production lead time and delivery lead time can be minimized through proper coordination, it is known fact that just after receiving the cabinet approval there are zero possibility to be cancel the approved orders unless otherwise the manufacture informed their inability supply the same. So public

sector organization can give them assurance to start the manufacturing process during the time of local letter of credits are been prepared. But, it need higher level firm authority to begin the manufacturing.

4.4.3. Purchase of Uniformed Material through DTAC in year 2016

Table 4-6-DTAC purchases 2016

Step Number	Number days of days	Accumulated dates	Camouflage Material	Pajama material	Grey Sheeting Material	Towel Blue	Bed Sheet with Pillow Slip
13	429	429	429	429	429	429	429
Total time taken for each purchases			**490**	**505**	**430**	**534**	**626**
GAP from scheduled date			61	76	01	105	197

Table 4-7 accumulated Time taken by DTAC to deliver material in 2016

Step Number	Accumulated dates	Camouflage Material	Pajama material	Grey Sheeting Material	Bed Sheet with Pillow Slip	Towel Blue
1	30	18	18	18	18	18
2	44	29	29	29	29	29
3	65	43	43	43	43	43
4	79	69	69	69	69	69
5	93	90	90	90	90	90
6	123	93	93	93	93	93
7	165	142	142	142	142	142
8	228	172	172	172	172	172
9	249	314	314	314	314	314
10	258	322	322	322	322	322
11	288	376	472	381	453	455
12	408	487	477	398	586	506
13	429	490	505	430	626	534

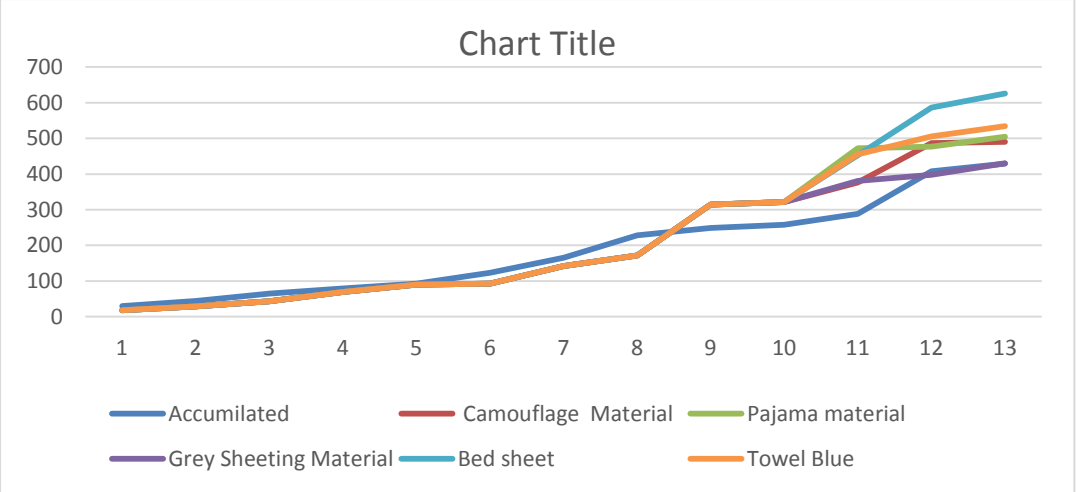

Figure 4-4 Lead time of DTAC purchases and scheduled time 2016

Material purchase from DTAC process in year 201 is concerned. considering stock availability at main warehouse SLAF requested only 5 material from DTAC and rest of the urgent material were purchase from SLAF procurement channel due to urgency and Higher lead time of DTAC purchasing process ,as per the scheduled material should come to main warehouse within 429 days. However, year 2016 DTAC purchases concerned the camouflage material was received after 490 of Demand and lead time gap is 61 days, Similarly pajama material, gray sheeting material, blue towel and bed sheets material were delivered to SMD after 505,430,534 and 626 days respectively and lead time gap is 76 days,01 days 165 days and 197 days respectively.

Most important factor is production lead time of the respective manufactures, as per the scheduled it is 90 days and in some special cases it goes up to 150 days to protect the local suppliers against the liquidity damage chargers, simply suppliers can take 90 or 150 days to manufacturing and delivering of material. This is the manufactures responsibility and in above camouflage manufacture has taken 11 days and bed sheet supplier has taken 133 days, rest of the suppliers has delivered the item within the allocated time. No liquidity damages, all suppliers are within the limit, this situation very clearly describe that there are no problem in between manufacturing and delivering, the processing time is the problem.

4.4.4. Purchase of Uniformed Material through DTAC in year 2017

Table 4-8 DTAC purchases 2017

Step Number	Number days of days	Accumulated dates	Camouflage Material	Pajama material	Grey Sheeting Material	Towel Blue	Single Jersey (black Colour) Material
13	429	429	429	429	429	429	429
Total time taken for each purchases			**482**	**502**	**496**	**505**	**564**
GAP from scheduled date			53	73	67	76	135

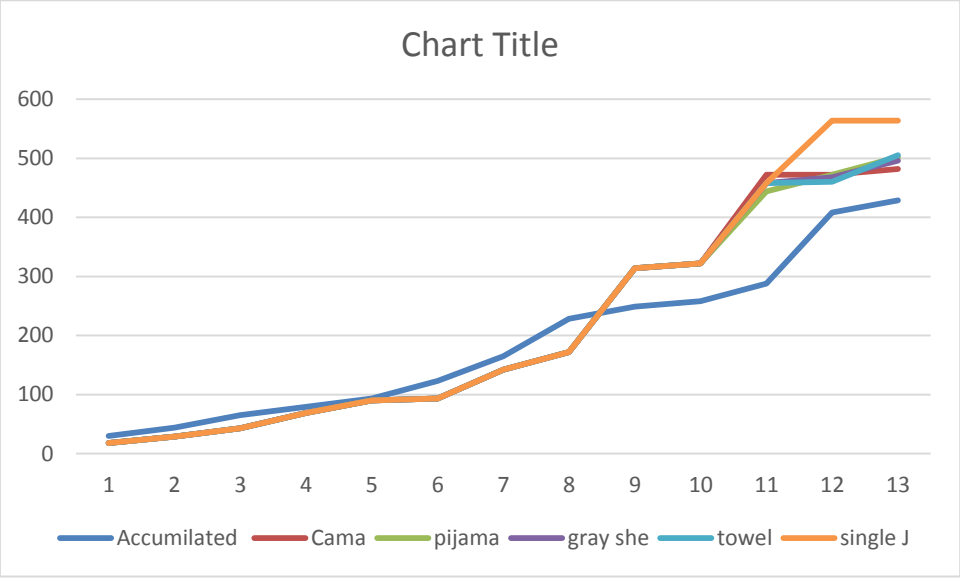

Figure 4-5Lead time of DTAC purchases and scheduled time 2017

Material purchase from DTAC process in year 2017 is concerned. considering stock availability at main warehouse SLAF requested only 5 material from DTAC and rest of the urgent material were purchase from SLAF procurement channel due to urgency and

Higher lead time of DTAC purchasing process ,as per the scheduled material should come to main warehouse within 429 days. However year 2017 DTAC purchases concerned the camouflage material was received after 482 of Demand and lead time gap is 53 days, Similarly pajama material, gray sheeting material, blue towel and single jersey material were delivered to SMD after 502,496,505 and 564 days respectively and lead time gap is 73 days,67 days 76 days and 135 days respectively.

Most important factor is production lead time of the respective manufactures, as per the scheduled it is 90 days, simply suppliers can take 90 days to manufacturing and delivering of material. This is the manufactures responsibility and in above case all the suppliers have delivered the material within very short time period. Camouflage material have been delivered to SMD in the same day they received the local letter of credit, pajama material within 28 days, gray sheeting within 10 days blue towel within 2 days and single jersey material within 76 days. No liquidity damages, all suppliers are within the limit, this situation very clearly describe that there are no problem in between manufacturing and delivering, the processing time is the problem.

When it comes to the 2014 to 2017 as a public sector organization SLAF has given more concentration on coordination and manufactures were informed to start the production prior to official letter of credit issued, it was very success and proven that lead time gap of the steps no 12 and 13 were reduced during this period.

4.4.5. Purchase of Uniformed Material through DTAC in year 2018

Table 4-9 DTAC purchases 2018

Step Number	Number days of days	Accumulated dates		Camouflage Material	Pajama material	Grey Sheeting Material	PT short material	PT T Shirts Material
1	30	30	08.11.17 18.12.17	40	40	40	40	40
2	14	44	31.01.18	44	44	44	44	44
3	21	65	10.02.18	10	10	10	10	10
4	14	79	15.02.18	5	5	5	5	5
5	14	93	22.03.18	35	35	35	35	35
6	30	123	25.05.18	64	64	64	64	64
7	45	165	05.10.18	130	130	130	130	130
8	60	228	14.01.19	99	99	99	99	99
9	21	249	23.01.19	9	9	9	9	9
10	30	258	20.02.19	28	28	28	28	28
11	30	288	27.02.19				7	
12	90	408	05.03.19				6	
13	21	429	07.03.19				2	
Total time taken for each purchases							**479**	
GAP from scheduled date							50	

From Year 2018 material demand only one items delivered to SLAF yet. Therefore researcher only consider the 11 steps for all items and 13 step for PT Short material up to 27 March 19.

Year 2018 material requirement was projected to DTAC on 18 Oct 2017and DTAC and cabinet approval for same was received 20th Feb 1019 and SLAF still sign the contract agreement for all the tenders, however local letter of credits was issued only for PT short material and other documents are still pending at finance ministry due to lack of liquidity to open LC. Up to now only PT short material received and only 15 days taken to

complete the step no 11 to 30 (As per scheduled it is 30+90+21=141 days) .The reason behind the story is the collaboration among the stakeholders .

When consider the 2014 to 2018 purchases from DTAC, it is very clearly proven that there is a lead time gap within the same process. As per schedule it is 429 days and physically it was more than that. Processing lead time start from step number one to step number ten is consuming more time, there are so many policies, regulations and rules to adhere in this process, approval authority have delegated to so many organizations and authorities. They do not aware the real problem when uniform material is not received on time. Simply, the Logisticians are fessing lot of difficulties since 2006

4.5. **The material supply from DTAC to public sector 2016 to 2018**

Researcher will analyzing the Material purchases from DTAC to public sector organization since 2016 to show the quantity allocation for each supplier and to prove that the quantity allocation is not happening in a justifiable manner and there is hidden myopia in this system.

4.5.1. Material Qty allocation and their valve as a summery in 2016

Table 4-10 summery of DTAC purchases 2016

S/No	Supplier	Qty in Mtrs	Total price
1	Organization 1	**401000**	**173145000.00**
2	Organization 2	**857000**	**316,585,000.00**
3	Organization 3	**288000**	**149,175,000.00**
4	Organization 4	**350000**	**57,750,000.00**
5	Organization 5	**1000500**	**362,200,000.00**
6	Organization 6	**127000**	**58,000,000.00**
7	Organization 7	**285000**	**58,950,000.00**
8	Organization 8	**300000**	**122,000,000.00**
9	Organization 9	**475000**	**173,250,000.00**
10	Organization 10	**125000**	**56,250,000.00**
11	Organization 11	**17000**	**15,250,000.00**
12	Organization 12	**130000**	**61,500,000.00**
13	Organization 13	**50000**	**19,000,000.00**
14	Organization 14	**50000**	**19,000,000.00**
15	Organization 15	**20000**	**19,000,000.00**
16	Organization 16	**75000**	**46,875,000.00**
17	Organization 17	**220000**	**84,700,000.00**

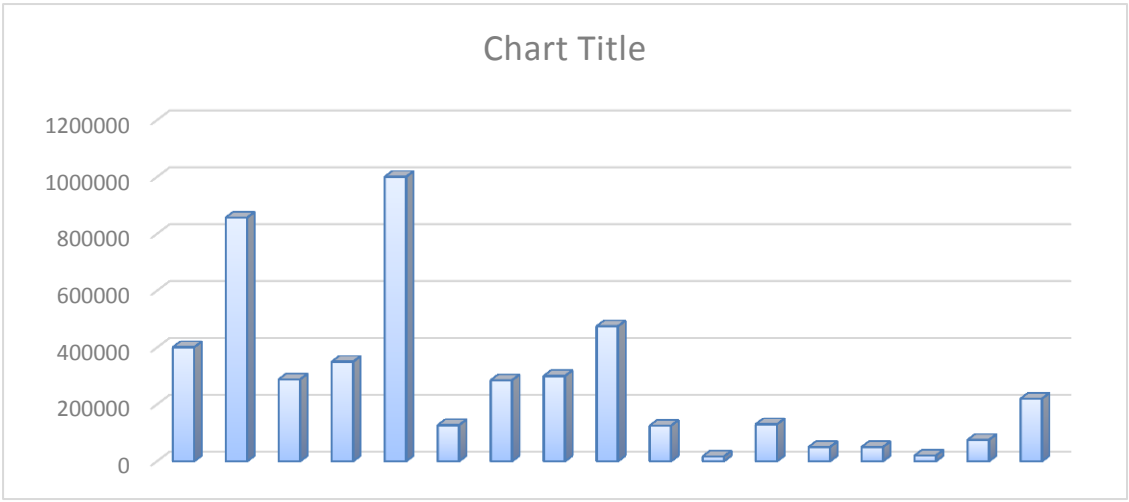

Figure 4-6Quantity allocation to suppliers 2016

Figure 4-7volume allocation to suppliers Price 2016

4.5.2. Material Qty allocation and their valve as a summery in 2017

Table 4-11 summery of DTAC purchases 2017

S/No	Supplier	Qty	Total price
1	Organization 1	941500	361443000.00
2	Organization 2	2198500	831435500.00
3	Organization 3	36000	15048000.00
4	Organization 4	391000	154523000.00
5	Organization 5	511500	75354000.00
6	Organization 6	425000	191300000.00
7	Organization 7	75000	24875000.00
8	Organization 8	125000	56250000.00
9	Organization 9	210000	90700000.00
10	Organization 10	53000	19900000.00

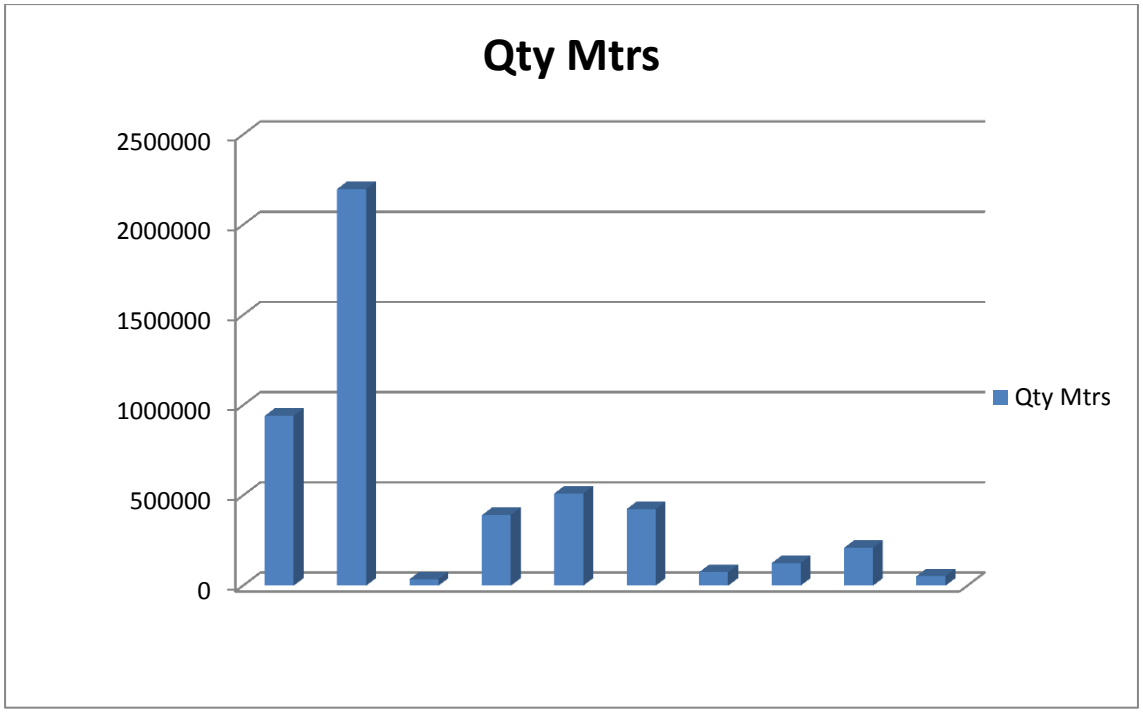

Figure 4-8quantity allocation to suppliers Price 2017

Figure 4-9volume allocation to suppliers Price 2017

4.5.3. Material Qty allocation and their valve as a summery in 2018

Table 4-12 summery of DTAC purchases 2018

S/No	Supplier	Qty Mtrs	Total
1	Organization 1	1070100	446577000
2	Organization 2	1707061	762692450
3	Organization 3	269000	155520000
4	Organization 4	225000	29025000
5	Organization 5	25000	5875000
6	Organization 6	92500	34900000
7	Organization 7	261000	36230200
8	Organization 8	25000	3625000
9	Organization 9	25000	3625000
10	Organization 10	50000	20000000
11	Organization 11	1000	1450000
12	Organization 12	70000	32650000
13	Organization 13	68000	27880000

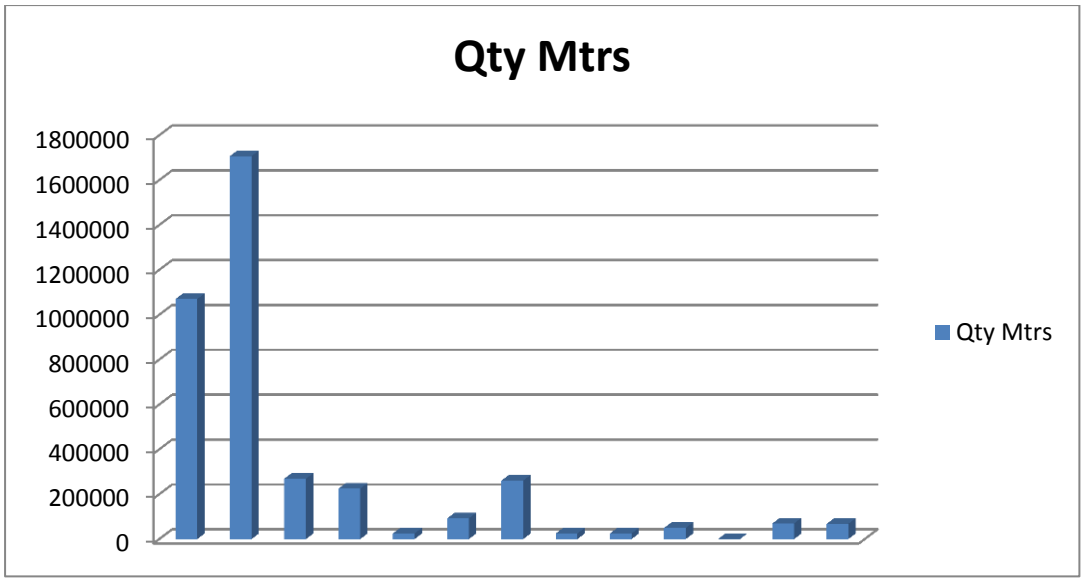

Figure 4-10Qty allocation to suppliers Price 2018

Figure 4-11volume allocation to suppliers Price 2018 Source -: SLAF tender document

4.5.3.1. Allocation of Quantity

With all details researcher has summarized the material quantity allocated to all suppliers since 2016 to 2018

Table 4-13summery of DTAC purchases 2016-2018

Year	No of suppliers	Qty allocated in Mtrs	Total Valve
2016	**17**	4770500	1792630000.00
2017	**10**	4966500	1820828500.00
2018	**13**	3888661	1560049650.00

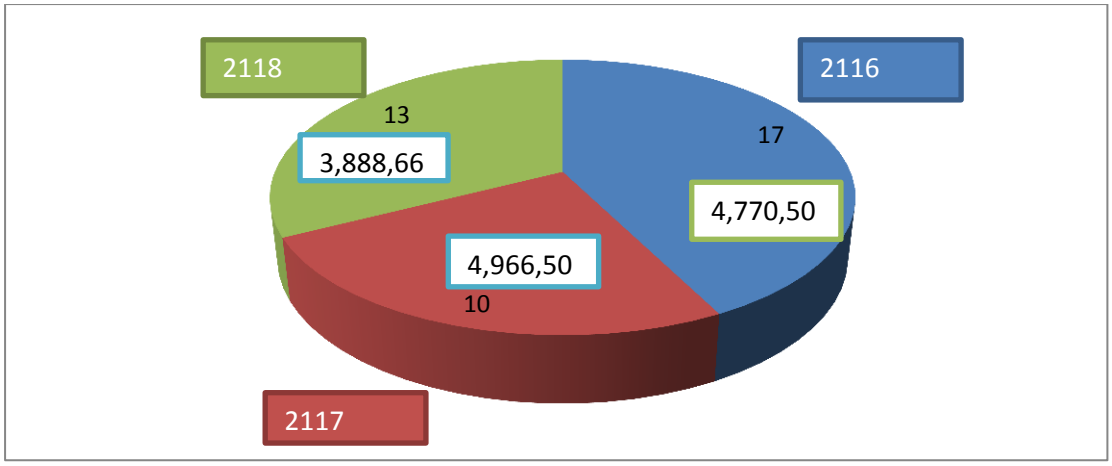

Figure 4-12Allocation to suppliers 2016 to 2018

With the above details in year 2016 DTAC allocated 4,770,500 mtrs of material among 17 suppliers and in year 2017 they allocated 4966500 mtrs of material among the 10 suppliers. During year 2018 DTAC allocated 3888661 mtrs of material among 13 suppliers. This variation of number of suppliers is happen due to violation of tender guidelines, past year's performance and price they have quoted in each year.

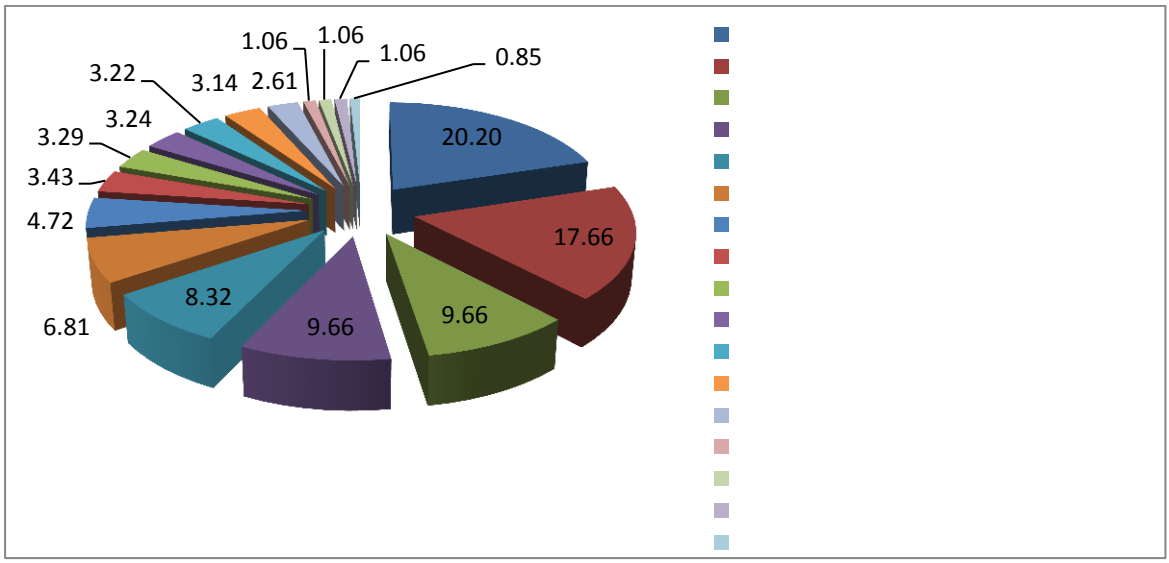

Figure 4-13 allocation to suppliers 2016

Further, researcher has observed that In year 2016 DTAC allocated 72.32% of material among 6 suppliers and only 27.68% were allocated among the rest of the suppliers.

Highest quantity allocated three suppliers are concerned, the ownership of the three company belongs to one person and he is getting 47.53% from the total material quantity of 2016.

In year 2017 material Quantity allocation is concerned there are 10 qualified suppliers and they got quantity allocation as follows

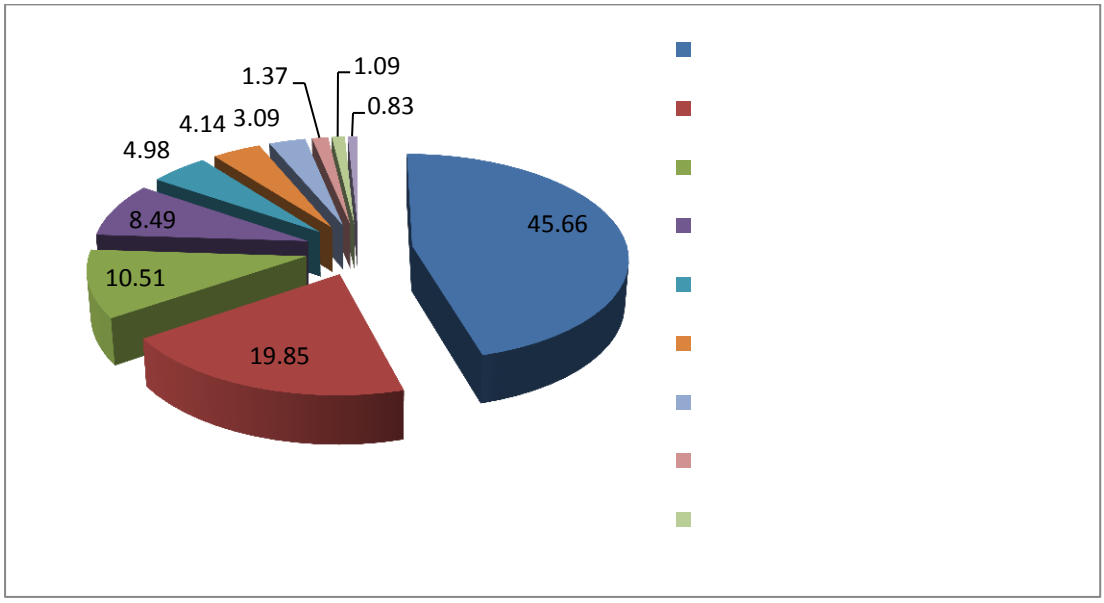

Figure 4-14 allocation to suppliers 2017

Researcher has observed that in year 2017 DTAC allocated 84.41% of material among 4 suppliers and only 15.49% were allocated among 6 suppliers. Highest quantity allocated & 3rd Highest quantity suppliers are concerned, the ownership is similar company belongs to one person and he is getting 56.17% from the total material quantity of 2017

In year 2018 material Quantity allocation is concerned there are 13 qualified suppliers and they got quantity allocation as follows

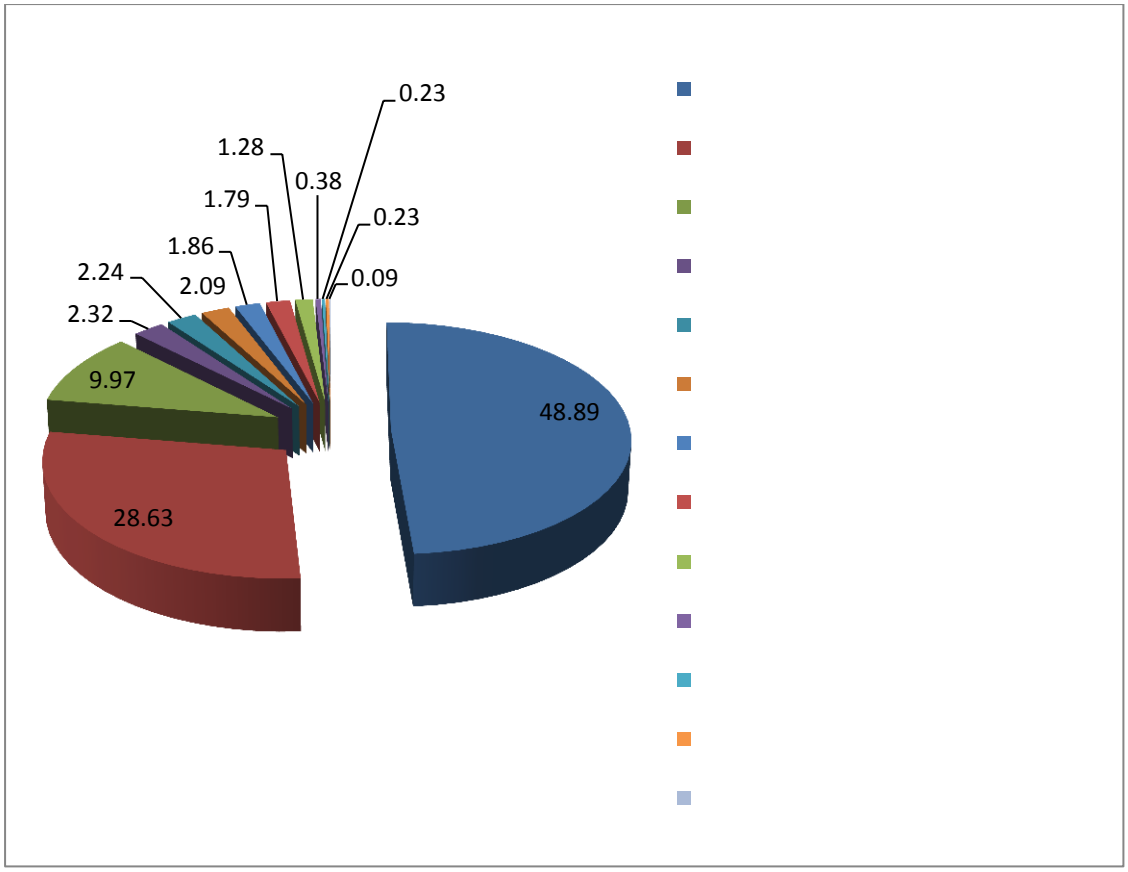

Figure 4-15 allocation to suppliers 2018

Researcher has observed that in year 2018 DTAC allocated 87.48% of material among 3 suppliers and only 12.52% were allocated among 10 suppliers. Highest quantity allocated suppliers got 48.89% from the total material quantity of 2018.

Up to now researcher discuss the Purchasing of material from Domestic textile allocation committee. It is proven fact, the lead time of the DTAC purchasing process is higher than the SLAF purchasing process. However, without examine the SLAF purchasing process it is difficult to understand this lead time gap.

To overcome the Issues related due to DTAC Process, Head of the Department of SLAF authorized to purchase some essential uniforms material required to complete annual kit issues through SLAF procurement process.

4.6. Material Purchase through SLAF Purchasing Process- 2013 to 2018

Due to emergency situation and When DTAC fail to supply the material on time SLAF procurement entity can do a purchases with the Special approval of Ministry of defense to prevent from stock out situation**.** Bellow chart will show the lead time of the SLAF procurement system and the Gap.

4.6.1. Material Purchase through SLAF Purchasing Process- 2013 and 2014

Table 4-14Material purchase Through SLAF purchasing unit in 2013 & 2014

Step Number	Number of days	Accumulated dates	Shirting dress material	Trouser material	Socks	Towel	Bed sheets
Tender File reference			QQDP-40127	QQDP-40075	QQDP-40003	RQDP - 40118	RQDP-30321
1	7	7	09.10.12	06.07.12	21.09.12	26.06.13	26.06.13
2	3	10	11.10.12	11.07.12	25.09.12	05.07.13	26.07.13
3	21	31	14.10.12	17.07.12	27.09.12	07.07.13	29.08.13
4	4	35	05.11.12	08.08.12	18.10.12	29.07.13	19.08.13
5	14	49	09.11.12	11.08.12	10.11.12	03.08.13	27.08.13
6	14	63	-	-	-	29.09.13	01.09.13
7	7	70	10.12.12	21.08.12	14.12.12	21.10 .13	20.09.13
8	7	77	14.12.12	23.08.12	03.01.13	31.10.13	27.09.13
9	7	84	20.12.12	29.08.12	17.02.13	13.11.13	06.10.13
10	7	91	29.12.12	6.09.12	29.02.13	25.11.13	27.10.13
11	90	181	02.03.13	14.01.13	02.05.13	19.02.14	25.03.14
12	18	199	10.03.13	22.01.13	08.05.13	24.02.14	07.04.14
13	3	**202**	12.03.13	28.01.13	09.05.13	25.02.14	08.04.14
Total Lead Time			152	172	228	240	282

Source -: SLAF tender document

4.6.1.1. 2013 to 2014 purchase summery

Table 4-15 summery of SLAF purchases 2013-2014

Step Number 01 to 13	Shirting dress material	Trouser material	Socks	Towel	Bed sheets
Order Number	QQDP-40127	QQDP-40075	QQDP-40003	RQDP -40118	RQDP-30321
Scheduled **203 Days**	09.10.12	06.07.12	21.09.12	26.06.13	26.06.13
	12.03.13	28.01.13	09.05.13	25.02.14	08.04.14
Total time taken for each purchases	152	172	228	240	282

As per above detailed, the demand of shirting material was generated on 9th Sep 2012 and to complete thirteen steps in the SLAF purchasing process takes 152 days and items added to S&MD stock bin card on 12th March 2013. Same as, to deliver trouser material purchase under order number QQDP- 40075 takes 172 days. To deliver socks purchase under order number QQDP- 40003 takes 228 days. In this Study Researcher found that Material such as shirting material and trouser material which had purchase from local market were received to SLAF before the scheduled date. Items such as Towel, Bed sheet and Shocks which are coming under import and supply basis have taken more time than scheduled date. However, the lead time gap from scheduled date to actual date is not larger compared with DTAC purchasing process

4.6.2. Material Purchase through SLAF Purchasing Process 2015 to 2016

Table 4-16summery of SLAF purchases 2015-2016

Step Number	Number days	Accumulated dates	Towel	Number days	Accumulated dates	Working Dress Shirting Material	Number days	Accumulated dates	Socks
Tender File reference			**CLO/1003**			**CLO/1015**			**CLO/1005**
1	7	7	15.02.2016	7	7	30.11.2016	7	7	01.06.2015
2	2	9	17.02.2016	7	14	07.12.2016	2	9	03.06.2015
3	15	24	04.03.2016	54	68	03.02.2017	27	36	30.06.2015
4	0	24	04.03.2016	0	68	03.02.2017	3	39	02.07.2015
5	1	25	05.03.2016	10	78	13.02.2017	1	40	03.07.2015
6	2	27	07.03.2016	9	87	22.02.2017	162	202	04.12.2015
7	76	103	25.05.2016	7	94	01.03.2017	11	213	15.12.2015
8	7	110	01.06.2016	7	101	08.03.2017	0	213	15.12.2015
9	103	213	11.09.2016	5	106	12.03.2017	75	288	02.03.2016
10	7	220	18.09.2016	4	110	16.03.2017	22	310	24.05.2016
11	58	278	15.11.2016	15	125	30.03.2017	6	316	30.05.2016
12	7	285	21.11.2016	18	142	18.04.2017	10	326	30.05.2016
13	4	289	26.11.2016	3	145	22.04.2017	7	333	07.06.2016
Total time taken for each purchases			**289**			**145**			**333**
GAP			**86**			**-58**			**130**

4.6.2.1. 2015 to 2016 summery

Table 4-1717 summery of SLAF purchases 2015-2016

Step Number 01 to 13	Towel	Trouser material	Socks
Order Number			
Scheduled	15 .02. 2016	30.11.16	01.07.15
203 Days	26.11. 2016	22.07.17	07.06.16
Total time taken for each purchases	289	145	333
	86	-58	130

As per above 2015 to 2016 SLAF purchase detailed, the demand of purchase of towel was generated on 15 .02. 2016 and to complete thirteen steps in the SLAF purchasing process takes 289 days and items added to S&MD stock bin card on 26.11. 2016. Same as, to deliver socks purchase under order number **CLO/1005** takes 333 days. To deliver trouser material purchase under order number **CLO/1015** only takes 145 days. In this Study Researcher found that s socks and towel which had purchase from local market were received to SLAF after the scheduled date. Items such as trouser material have taken less time than scheduled date. However, the lead time gap from scheduled date to actual date is not larger compared with DTAC purchasing process

4.6.3. Material Purchase through SLAF Purchasing Process 2017 to 2018

Table 4-18summery of SLAF purchases 2017-2018

Step Number	Number days	Accumulated dates	Socks	Number days	Accumulated dates	Working Dress Shirting Material	Number days	Accumulated dates	Working Dress Trouser Material
Tender File reference			**CLO/1010**			**CLO/1088**			**CLO/1001**
1	7	7	26.05.2017	7	7	16.08.2017	7	7	02.02.2017
2	4	11	30.05.2017	2	9	18.08.2017	11	18	13.02.2017
3	23	34	23.06.2017	18	27	06.09.2017	1	19	14.02.2017
4	4	38	27.06.2017	2	28	08.09.2017	1	20	14.02.2017
5	1	39	28.06.2017	2	30	10.09.2017	1	21	14.02.2017
6	61	100	31.08.2017	37	67	17.10.2017	1	22	14.02.2017
7	26	126	01.09.2017	22	89	10.11.2017	1	23	14.02.2017
8	7	133	12.10.2017	7	96	17.11.2017	7	30	14.02.2017
9	11	144	12.10.2017	6	102	23.11.2017	9	39	02.03.2017
10	12	156	24.10.2017	9	111	02.12.2017	52	91	24.04.2017
11	7	163	11.01.2017	4	115	06.12.2017	100	191	04.04.2017
12	10	173	11.10.2017	44	160	21.01.2018	18	209	22.08.2017
13	42	215	12.09.2017	31	191	22.02.2018	16	225	08.09.2017
Total time taken for each purchases			215			191			225
GAP From Scheduled date			12			-12			22

4.6.3.1. 2017 to 2018 summery

Table 4-19 summery of Material purchase Through SLAF purchasing process in 2017 & 2018

Step Number 01 to 13	Socks	Shirting dress material	Trouser material
Order Number			
Scheduled	26.05.17	16.08.17	02.02.17
203 Days	12.09.17	22.02.18	08.08.17
Total time taken for each purchases	215	191	225
GAP From Scheduled date	12	-12	22

Source -: SLAF tender document

In this Study researcher very clearly demonstrated the Lead time gap in between DTAC purchasing process and SLAF purchasing process. Both the processes comprised with 13 steps and individual steps takes time to complete task. During the study, researcher observed the lead time of DTAC purchasing process is very much higher than SLAF purchasing process. However, as per government policy, all public sector organizations have to purchase uniformed material requirement through DTAC. Therefore minimizing of lead time gap is an essential requirement to provide annual kit issue requirement as per AOC schedule and to provide material to stitching of uniform at SLAF Garment factories without machine idling Situation.

Considering all, the researcher conducted interviews with the industry experts in DTAC, SLITA, DTAC Suppliers and users to find the reasons for this lead time issue. Researcher developed two type of questioner to gather data relevant to current study. Out of that, first Questioner developed to gather the data relevant to variables and the second questioner was develop to get the physical details such as machine availability, Factory capacity, Employment, Water and Electricity consumption of selected DTAC suppliers since 2015.

4.7. Collaboration among the stakeholders in the DTAC process

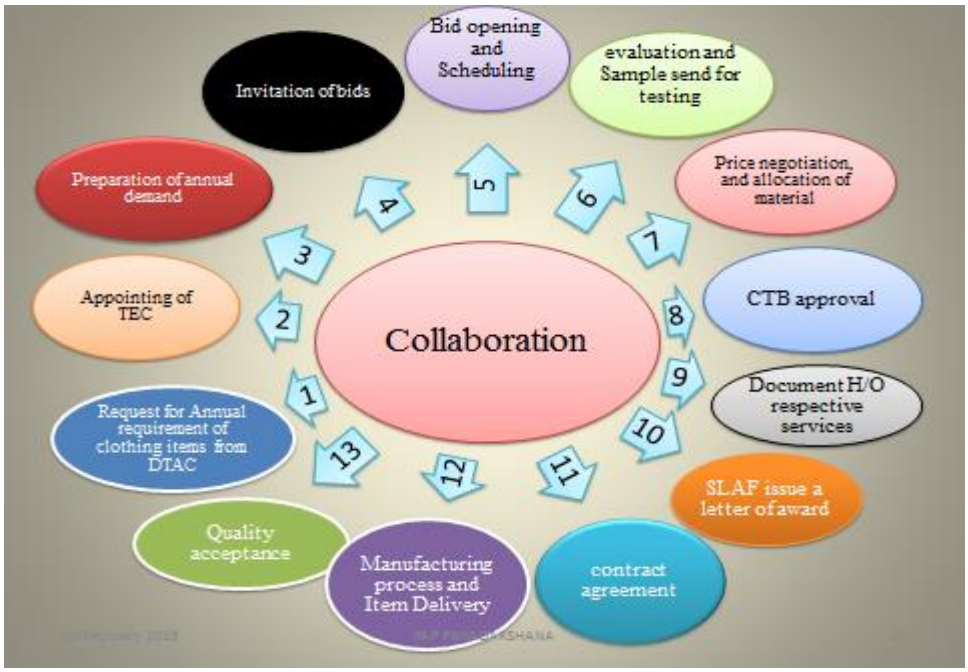

Figure 4-16 Collaboration among the stakeholders

Collaboration among the stakeholders up to order completion level is very much important and during the survey, researcher found that, if the controlling authority can improve the coordination on stakeholders in DTAC purchasing process the lead time gap can be minimized. To minimized lead time gap, DTAC have to play major roll. Coordination among manufactures, public sector organization, SLITA, TEC, Banks, and Quality Acceptance Committee is very much important and DTAC should pay more attention to keep coordination at every stages of DTAC purchasing process.

DTAC purchasing process is comprise with 13 steps and minimizing lead time of each individual step is important to minimized Total lead time.

4.7.1. Expansion of Production Capacity

Expansion of production capacity can be measured through number of machines installed, electricity and water consumption, new factories opened, employment generation and quantity of uniform material allocated by the DTAC. To get the details

related to this area researcher developed questioner and all details obtains from DTAC suppliers. Data analysis have been done to find the reason why that DTAC suppliers fails to supply uniformed material on time and to determine the relationship between lead time gap and factory capacity. During the study, researcher collect the details of machines installed by the suppliers during last five year period to see the improvement of capacity, electricity and water consumption of last five years to see the improvement of capacity, new factories opened, employment generation and quantity improvement of uniform material.

4.7.2. Number of Machines Installed

Through the questioner and observation during the field visit researcher gathered bellow mentioned data and information and same will be critically analyzed in this section to see the relationship between development of capacity and annual production and how it affected to minimized lead time gap of material purchases through DTAC. Number of machines available with the four major uniform manufacturers and machine addition during 2014 and 2018 are presented below.

4.7.2.1. Machine Availability of P. Industries

Table 4-20 Machine availability of P Industries (Cumulative)

Category of Machine	**2014**	**2015**	**2016**	**2017**	**2018**
Air Jet Machines	32	38	40	48	90
Rapier	8	8	8	8	8
Finishing Machine	02	2	2	2	2
Sizing Machine	01	1	1	1	1
Small Jiggers	1	1	1	1	1
Bleaching Machine	1	1	1	1	1
Single Folder Machine	2	2	2	2	2
Singing And Desizing	1	1	1	1	1
Rapear Looms	8	8	8	8	8
Shuttle Looms	75	75	75	75	75
Direct Warper	1	1	1	1	1
Section Warper	2	2	2	2	2
Cylinder Dryer (Separate)				1	1
Jambo Jigger	1	1	1	2	2
Jet Machine	1	1	1	2	2
Finishing Stenter (06 Chamber)	1	1	1	2	2
Rolling Machine	1	1	2	2	3
Single Folder Machine	2	2	2	2	2

4.7.2.2. Machine Availability of M/s V. Industries

Table 4-21 Table 4.21 Machine availability of M/s V Industries(Cumulative)

TYPE OF MACHINE	2014	2015	2016	2017	2018
Air Jet Machines	24	36	50	54	56
Rapier Towel Vamatex High Speed	--	--	--	08	08
Sizing Machines	01	01	01	01	01}
Singing And Desizing	01	01	01	01	01}
Saurer 500 Rapier	20	20	20	20	20
Direct Warper	01	01	01	01	01
Section Warper	04	04	04	04	04
Singing And Desizing	01	01	01	01	01
Mercerizing Machine	--	--	--	--	--
Bleaching Machine	--	--	--	--	--
CylinderDryer(Separate)RelaxDryer	01	01	01	01	01
Cold Pad Batch Dying Machine	--	--	--	--	01
Jambo Jigger	--	--	02	02	02
Small Jigger	07	07	07	07	07
J.T Machine (Bleaching Unit)	01	01	01	01	01
Jet Machine	03	03	03	05	05
Rotary Printing Machine	OUT SOURCING				
Finishing Stenter (06 Chamber)	01	01	01	01	01
Rolling Machine	03	03	05	07	07
Single Folder Machine	01	03	03	05	05
Airjet towel Machine	--	--	--	--	03
Shuttle Towel Power Loom	100	72	72	72	36
Shuttle Fabric Power Loom	100	--	--	--	--

4.7.2.3. Machine Availability of M/s C Tex

Table 4-22 - Machine availability of M/s C Tex (Cumulative)

TYPE OF MACHINE	**2014**	**2015**	**2016**	**2017**	**2018**
Air Jet Machines	70	70	70	70	194
Rapier	-	-	-	-	-
Sizing Machines	01	01	01	01	01
Singing And Desizing	01	01	01	01	01
Saurer 500 Rapier	41	41	41	41	41
Direct Warper	01	01	01	01	01
Section Warper	01	01	01	01	01
Singing And Desizing	01	01	01	01	01
Mercerizing Machine	01	01	01	01	01
Bleaching Machine	03	03	03	03	03
Cylinder Dryer (Separate)	01	01	01	02	02
Cold Pad Batch Dying Machine	01	01	01	01	01
Jambo Jigger	05	05	05	04	03
Small Jigger	04	04	04	04	04
J.T Machine (Bleaching Unit)	01	01	01	01	01
Jet Machine	06	06	06	06	09
Rotary Printing Machine	01	01	01	01	01
Finishing Stenter (06 Chamber)	03	03	03	03	03
Rolling Machine	03	03	03	03	03
Single Folder Machine	04	04	04	04	04
Air compresure	08	08	08	10	13
Knotting machine	2	2	2	7	7
Wainding machine	2	2	2	2	2
Re wainding machine	1	1	1	2	2
Reed cleaning machine	1	1	1	2	2
Inspection machine	4	4	4	4	4

4.7.2.4. Machine availability of H international

Table 4-23 Machine availability of M/s h international

TYPE OF MACHINE	**2014**	**2015**	**2016**	**2017**	**2018**
Single cylinder socks machine	24	24	24	24	24
Double cylinder socks machine	50	80	80	80	80
socks linking machine	3	3	5	5	5
Steam setting machine	-	1	1	1	1
Fabric knitting machine	-	-	2	2	2
Fully computerized socks k/ machine	-	-	-	-	6

According to above data, all the manufacturers have been increased their machine capacity during 2014 to 2018 period. During the direct interview carried with Mr Fxxxx, the owner of M/s C Tex has intimated that he has established new factory in 2009 in addition to his existing factories. M/s C industries and added 124 Air Jet looms by 2018. Now the number of air jet loom available is 194 machines. With the government new policy decision and assurance of purchasing of all school uniform requirement from local market all domestic suppliers including M/s C Tex, M/s P industry, Ms. v industries and etc make arrangement to purchase many numbers of machineries such as Jumbo Jiggers, Small Jiggers, Batch dying, Sizing machines, Rotary printer, Single folders etc.. Accordingly M/s P… Tex Industries which owned 40 Air Jet looms in 2014 has increased it to 75 by 2018. M/s V.. Industries had qty 24 Air Jet looms in 2014 has increased its fleet to 56 by 2018.

Expansion of machine capacity is automatically effect to increase the material production and there is a positive relationship in between machines and production. However, researcher's argument is even though the factory production capacity increased, the lead time for supping of uniformed material to public sector has not been reduced from the DTAC.

4.7.3. Electricity and Water Consumption

When production increases electricity and water consumption also increases. Following table shows electricity and water consumption of DTAC uniform manufacturers since year 2014 to 2018. Electricity consumption of all manufactures decreased gradually because they are not allow to manufacture School Uniformed since 2015. During the field visit and direct interview held with Dr Hxxxxx the managing partner of M/S v. industries researcher ask the reason for electricity and water bill reduction. He has intimated that, as a cost cutting technical they have removed old type of machine with less capacity and installed high efficient new machine which consume less electricity and water. In the same time they were informed that they use natural well water for their manufacturing process and main reason for dropping of the electricity and water is as not getting school uniform orders from education ministry

4.7.3.1. Electricity Consumption of four Uniform Manufacturers (units and Rs value)

Table 4-24Electricity Consumption of four Uniform Manufacturers

Manufacturer	2014	2015	2016	2017	2018
M/S PTex Industries	490150	516647	509441	441698	497715
	9,892,615	7,751,718	8,365,097	8,331,018	9,892,965
M/S V.Industries	297403	300264	184613	220775	198459
	6542336	5605858	3858781	4595470	4041819
M/s h.international	60000	66000	96000	96000	96000
	1320000	144000	2040000	2040000	2040000
M/s C.Tex	4049390	2630545	1146363	1287452	1641545
	89086599	57871997	25219989	28323942	36113995

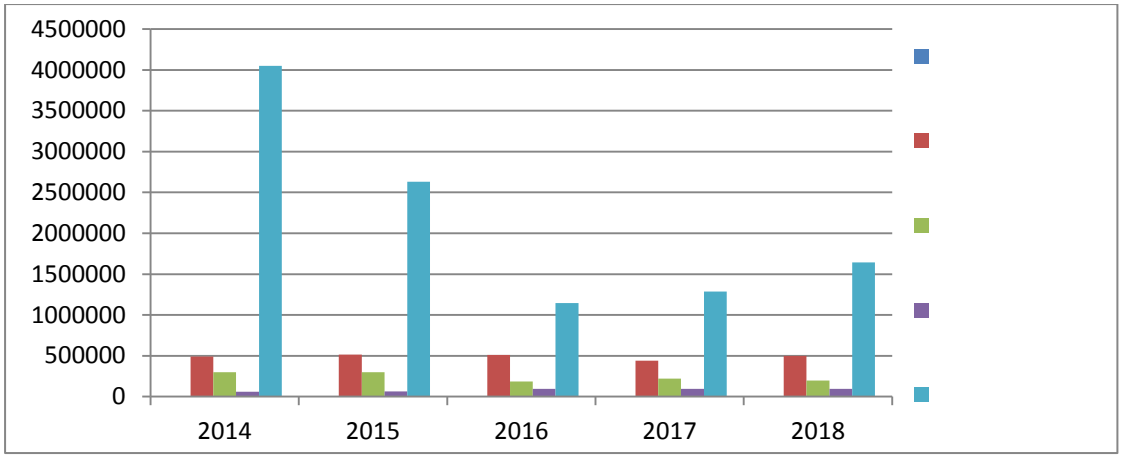

Figure 4-17 Electricity Consumption of four Uniform Manufacturers (UNITS)

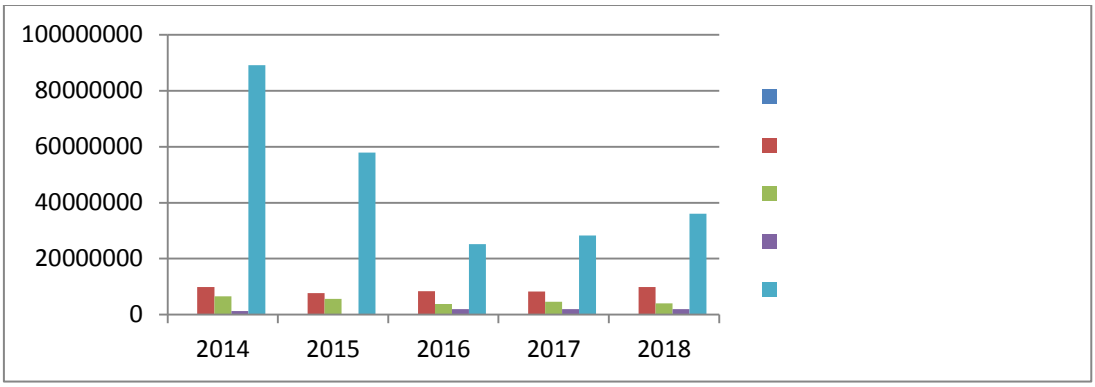

Figure 4-18Electricity Consumption of four Uniform Manufacturers (Rs)

4.7.3.2. Water Consumption of four Uniform Manufacturers

Table 4-25 Water Consumption of four Uniform Manufacturers unit and Rs. value

Manufacturer	2010	2011	2012	2013	2014
M/S P Tex Industries	2392	2554	2910	3219	3350
	164656.00	171118.00	112475.00	215851.00	221291.00
M/S V Industries	1122	1190	1280	1304	1460
	31000.00	32350.00	33300.00	49100.00	57800.00
M/s h international	132	144	170	170	170
	12600.00	13200.00	16200.00	16200.00	16200.00
M/s C Tex	4005	4002	6784	7137	8923
	275688.00	268134.00	262209.00	478574.00	589427.00

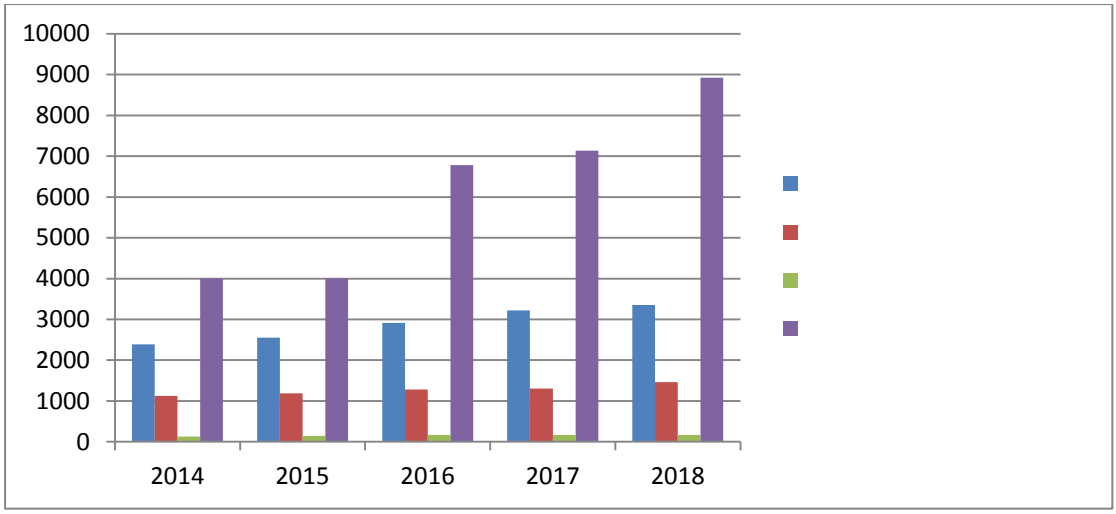

Figure 4-19 Water Consumption of four Uniform Manufacturers unit

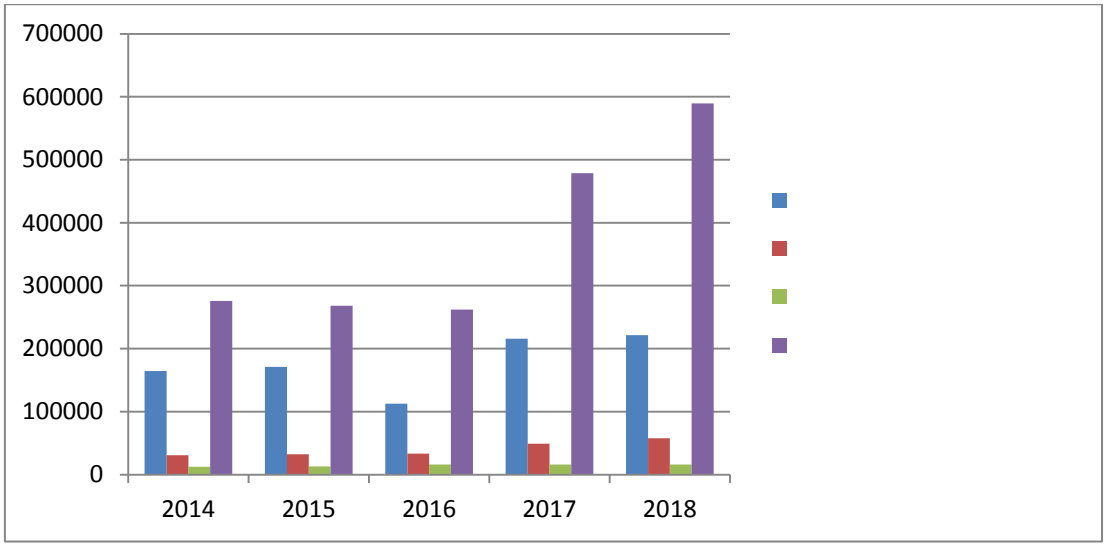

Figure 4-20Water Consumption of four Uniform Manufacturers Rs

4.7.4. Employment Generation

When manufacturers get more orders from state sector they have to increase their capacity of production. To increase the production, manufacturers have to employ additional employees. Following table shows how manufacturers increased their employees

Table 4-26Employment of Workers of four Manufacturers

Manufacturer	2014	2015	2016	2017	2018
M/S P Tex Industries	250	280	300	300	350
M/S V Industries	125	105	125	157	167
M/s H international	33	36	82	82	88
M/s C Textile	160	180	270	270	350

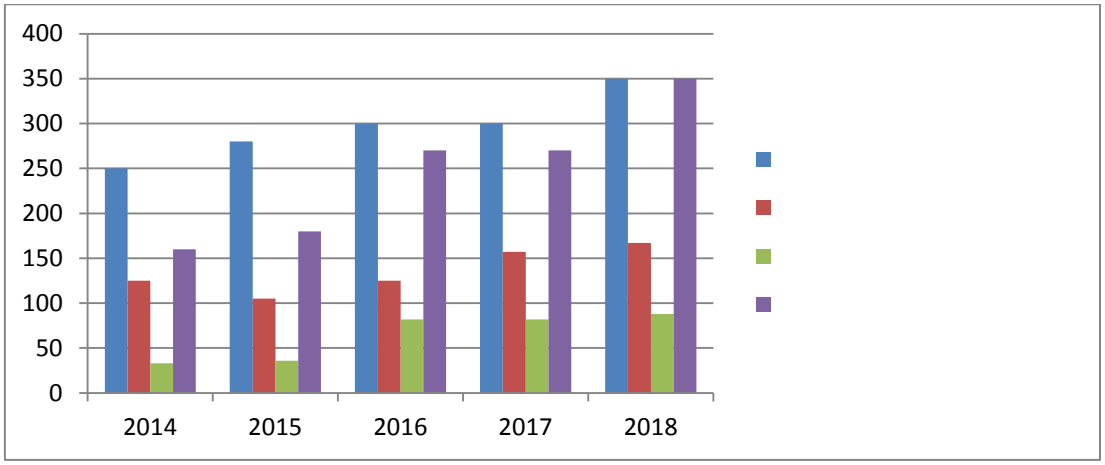

Figure 4-21 Employment of Workers of four Manufacturers

All manufactures have increased their employees since 2014 to 2018 period. As an example M/s c textile had 160 employees in 2014 and they increased it up to 350 in 2018. In the same time M/S V. Industries, M/S P. Tex Industries also increased their employees. However , M/s H. international has maintaining same level of working strength since 2016 and during the interview held with Mrs. Hxxx, the managing director and the owner of the factory informed that they have removed the all type of machineries and introduced new machines during 2014 to 2018. With new technology they could manage existing employees from them to maintain good efficiency rate.

4.7.5. New Factories Opened

The owner of M/s C Industries who participates scheme of supplying uniform materials to state sector has established a new factory called C. Tex at D. Industrial Estate managed by the Ministry of Industry and Commerce. The owners of the company stated that this factory is established mainly to cater the uniform material requirement of the Sri Lankan government. This factory equipped with modern facilities which includes 70

high efficiency Air Jet machines which can weave 100. Meters per hour. Its' machine efficiency is 5 times higher than the normal rapier looms. The same owners of the above two factories is had opened a factory called D.M. in the same Industrial Estate in early 2016. M/s P.tex also opened his new factory at Kaluthara instead of his existing factory at Madapatha, Piliyandala to assist the government new policy of purchasing of uniform material from local manufactures.

4.7.6. Increase of Quantity Allocated to Local Manufacturers by DTAC.

Increase of quantity allocated to the local textile manufacturers under the scheme could be verified by three factors. First one is capacity assessment reports prepared by the SLITA and the second one is the quantity of uniform material allocated by the DTAC during 2006 and 2018. Third one is the quantity allocated to grey processors because when capacity of weavers increases automatically the quantity allocated to the grey processors would show downward trend.

4.7.7. Capacity Assessment

After introducing the scheme of purchasing uniform materials from local manufacturers to the state institutions, production capacity of the manufacturers has also increased. Following table shows the capacity assessment prepared by the researcher for main uniform manufacturers. These capacities are considered by the DTAC at the price and quantity negotiation.

Table 4-27- Annual Production Capacity of the four Uniform (Shirt/Frock) Manufacturers during 2014 and 2018

Manufacturer	**2014**	**2015**	**2016**	**2017**	**2018**
M/S P.tex	9,500,000	6,000,000	6,550,000	9,000,000	9500000
M/S V	3,000,000	3,000,000	3,000,000	4,000,000	5,500,000
M/s H inter	300000	325000	525000	525000	580000
M/S C textile					
Weaving mtr	1,2 00,000	2,500,000	2,500,000	4,500,000	5,500,000
Processing	8,000,000	10,000,000	10,000,000	10,000,000	15,000,000

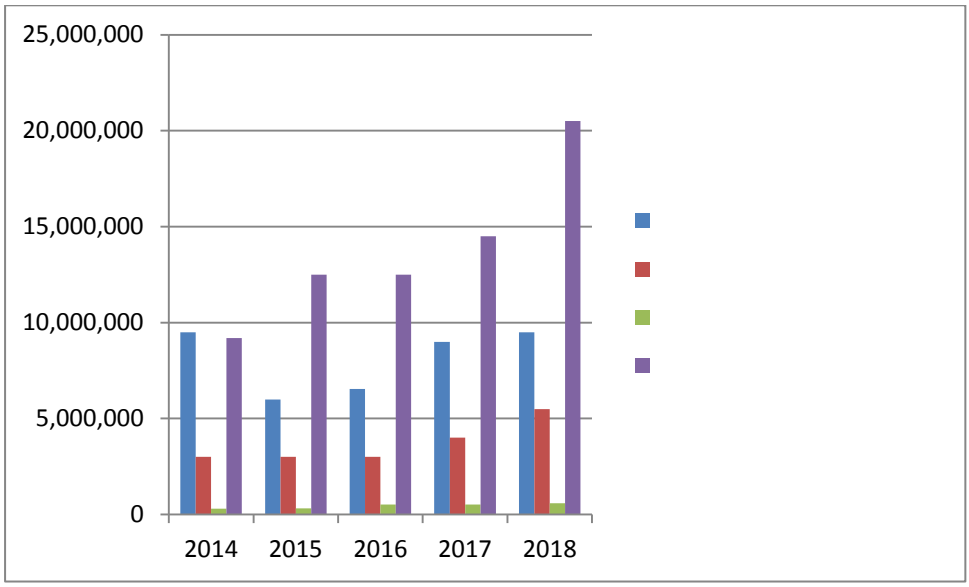

Figure 4-22 Annual Production Capacity of four Uniform Manufacturers

4.8. Data Analysis- through IBM SPSS software "Likert Scale" questioner no 1

The collected data from different sources were put into computer and by using MS Excel and SPSS statistical analysis software following analysis was done: Those variables which were putting a significant impact in this research were tested through statistical method "Likert Scale" and SPSS software to identify level of impact on lead time gap. Pie chart in different forms as well as histogram, bar chart, line charts are also explaining the particular facts and figures that are revealed during this research. In processing stage all the facts & figures have been provided which is considered as necessary ingredients of this research.

The second Questionnaire comprises with 60 questions and questions are related to each independent variable. The independent variables and moderator variable of current study can be listed as follows.

i. Coordination on paper work up to order completion
ii. Expansion of production capacity.

iii. New technologies.
iv. Quality improvement.
v. Government incentives.
vi. Material acceptance procedure.
vii. Higher level supervision

All questions were develop according to Likert Scale. All questions are multiple choice questions and example given below.

Table 4-28Questioner sample

Questions	SD	D	N	A	SA
If the Domestic Textile Allocation Committee is well coordinated with the Stakeholders during the DTAC purchasing processes, lead time can be minimized					

SA, A, NAND, D, SD indicates that:

SA – Strongly agree

A – Agree

N – Neutral

D –Disagree

SD – Strongly disagree

There are scoring for the questions in the questionnaire based on a presumed evaluation. The responses for the research questionnaire will be evaluated as follows: (1-5 is the Likert scale assumed number range.)

Table 4-29Scoring in Likert scale

Response	Scoring
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

Questioner distributed to 35 industry experts and 32 were responded to the same. The questioner included 60 questions under six independent variable (collaboration, capacity, quality, technology, government incentives and acceptance), moderator variable (higher level supervisions) and defendable variable.(efficient and effective material supply through DTAC). Cronbach's Alpha was used for testing the reliability of the questionnaire responses where the critical point for Cronbach's Alpha is 0.7. Indicating reliability and stability of results. The results were tabulated and presented as below. Cronbach's Alpha was used for testing the reliability of the questionnaire responses, using SPSS software. The Alpha test was run on the different sections related to each variables of the questionnaire: Collaboration (0.333), Capacity (0.802), Quality (-.356) Technology (0.158) Acceptance (0.737) Government incentives (0.351) and High level supervision (0.393) due to the many subscales. The critical point for Cronbach's Alpha is 0.7, and in this case the average score for all variables was found to be 0.776. From the test, one can safely conclude that the results are reliable and stable, as indicated in Table 1 below.

4.8.1. Reliability test

Table 4-30Case Processing Summary

Case Processing Summary			
		N	%
Cases	Valid	32	100.0
	Excluded[a]	0	.0
	Total	32	100.0
a. Listwise deletion based on all variables in the procedure.			

Table 4-31reliability statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.776	60

kline (1999) noted that although the generally accepted value of 0.8 is appropriate for cognitive tests such as intelligent tests , for ability tests a cut-off point of 0.7 if more suitable. He goes onto say that when dealing with psychological construct values bellow even 0.7 can, realistically, be expected because of the diversity of the constructs being measured. In this study the Cronbach's alpha value is 0.776. The result is above 0.7 and reliability of the questioner is in accepted level. Therefore researcher can do an advance analysis to see the relationship and impact on undependable variables in to defendable variable.

4.8.2. Descriptive Statistical Analysis

Descriptive statistical analysis was conducted under the each variable using SPSS and results can be summarized for each variable is as follows. The result of each question also investigated and reasons for mean value is critically analyzed.

4.8.2.1. Collaboration

Under the first variable "collaboration", there were 8 questions. The mean value & SD for received frequencies for fist variable is as follows

Table 4-32 statistics related to collaboration

Statistics									
		QC1	QC2	QC3	QC4	QC5	QC6	QC7	QC8
N	Valid	32	32	32	32	32	32	32	32
	Missing	0	0	0	0	0	0	0	0
Mean		4.9375	4.5000	4.3750	4.5000	4.4062	4.4688	4.2812	4.5312
Std. Deviation		.24593	.50800	.49187	.50800	.49899	.50701	.45680	.50701
Variance		.060	.258	.242	.258	.249	.257	.209	.257

The mean value received for fist 8 question is more than 4.5 and when collaboration among the stakeholders getting stronger and stronger there is a possibility of enhancing the efficient and effective uniform material supply from DTAC to public sector.

4.8.2.2. Capacity

Under the second variable "capacity", there were 6 questions. The mean value of frequencies received for Quotation no 9 to 14 is shown below. The capacity of the DTAC supply chain getting improved the efficiency and effectiveness also getting improved.

Table 4-33statistics related to capacity

statistics							
		QCA9	QCA10	QCA11	QCA12	QCA13	QCA14
N	Valid	32	32	32	32	32	32
	Missing	0	0	0	0	0	0
Mean		1.5625	1.5000	1.5625	2.1562	1.4375	1.6250
Std. Deviation		.80071	.67202	.80071	1.27278	.66901	.79312
Variance		.641	.452	.641	1.620	.448	.629

4.8.2.3. Quality

Under the third variable "quality", there were 9 questions. The mean value of frequencies received for Quotation no 15 to 23 is shown below. The quality of the DTAC supply chain getting improved, automatically the efficiency and effectiveness also getting improved.

Table 4-34 statistics related to quality

Statistics										
		QQ15	QQ16	QQ17	QQ18	QQ19	QQ20	QQ21	QQ22	QQ23
N	Valid	32	32	32	32	32	32	32	32	32
	Missing	0	0	0	0	0	0	0	0	0
Mean		4.6250	3.5625	4.2500	1.4688	4.3125	1.3438	1.6875	4.1250	5.0000
Std. Deviation		.49187	.80071	.43994	.50701	.47093	.48256	.47093	.42121	.00000
Variance		.242	.641	.194	.257	.222	.233	.222	.177	.000

4.8.2.4. Technology

Under the fourth variable "technology", there are six questions. The mean value and std. deviations of frequencies received for Quotation no 24 to 29 is shown below. The technology of the DTAC supply chain getting improved, automatically the efficiency and effectiveness also getting improved

Table 4-35 statistics related to technology

Statistics							
		QT24	QT25	QT26	QT27	QT28	QT29
N	Valid	32	32	32	32	32	32
	Missing	0	0	0	0	0	0
Mean		1.6250	2.7500	1.4062	4.5312	4.5938	4.9688
Std. Deviation		.70711	.98374	.55992	.50701	.49899	.17678
Variance		.500	.968	.314	.257	.249	.031

4.8.2.5. Government incentives

Under the fifth variable "government incentives", there are seven questions. The mean value and std. deviations of frequencies received for Quotation no 30 to 36 is shown below. The government incentives and protection to the DTAC supply chain getting improved, automatically the efficiency and effectiveness also getting improved

Table 4-36statistics related to government incentives

Statistics								
		QG30	QG31	QG32	QG33	QG34	QG35	QG36
N	Valid	32	32	32	32	32	32	32
	Missing	0	0	0	0	0	0	0
Mean		1.5625	4.5312	1.5312	1.4375	1.9375	1.6562	1.5312
Std. Deviation		.71561	.50701	.71772	.66901	.84003	.78738	.71772
Variance		.512	.257	.515	.448	.706	.620	.515

4.8.2.6. Acceptance

Under the sixth variable "Acceptance" there are five questions. The mean value and std. deviations of frequencies received for Quotation no 37 to 41 is shown below. The material acceptance at R&D of respective public sector organization can minimized the lead time gap of DTAC supply chain

Table 4-37 statistics related to acceptance

Statistics						
		QA37	QA38	QA39	QA40	QA41
N	Valid	32	32	32	32	32
	Missing	0	0	0	0	0
Mean		1.8750	1.4062	1.5938	2.8750	1.6250
Std. Deviation		.87067	.49899	.79755	1.36192	.79312
Variance		.758	.249	.636	1.855	.629

4.8.2.7. High-level supervision

Under the moderator variable “High-level supervision” there are seven questions. The mean value and std. deviations of frequencies received for Quotation no 42 to 48 are shown below. The High-level supervision improved it is helpful to enhance the power of each individual variables of DTAC supply chain.

Table 4-38statistics related to higher level supervision

Statistics								
		QH42	QH43	QH44	QH45	QH46	QH47	QH48
N	Valid	32	32	32	32	32	32	32
	Missing	0	0	0	0	0	0	0
Mean		4.4688	4.4688	4.1875	4.3125	4.3750	4.3125	4.5000
Std. Deviation		.50701	.50701	.39656	.47093	.49187	.47093	.50800
Variance		.257	.257	.157	.222	.242	.222	.258

4.8.2.8. Efficiency and effectiveness

Under the dependable variable “Efficiency and effectiveness of material supply through DTAC to public sector” there are 12 question. The mean value and std. deviations of frequencies received for Quotation no 49 to 60 are shown below. The Efficiency and effectiveness of material supply through DTAC to public sector can improved by enhancing the collaboration, technology ,capacity, quality, government support and quick acceptance in DTAC supply chain.

Table 4-39statistics related to efficiency and effectiveness

Statistics													
		QE49	QE50	QE51	QE52	QE53	QE54	QE55	QE56	QE57	QE58	QE59	QE60
N	Valid	32	32	32	32	32	32	32	32	32	32	32	32
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		4.9062	4.5000	4.3750	4.5000	4.4062	4.4688	4.2812	4.5312	4.3438	4.3125	4.3125	4.2188
Std. Deviation		.29614	.50800	.49187	.50800	.49899	.50701	.45680	.50701	.48256	.47093	.59229	.70639
Variance		.088	.258	.242	.258	.249	.257	.209	.257	.233	.222	.351	.499

The answers received for question number 49 to 60 is come under strongly agreed or agreed category. In generally all respondents are believing that, The Efficiency and effectiveness of material supply through DTAC to public sector can improved by enhancing the collaboration, technology ,capacity, quality, government support and quick acceptance. Further, application of Standard Lead time, application of Performance Measurement system, adheres to annual procurement budget, availability and raw material supply to manufactures, existing dollar rate fluctuation, yarn availability at foreign suppliers also influencing for the efficient and effective uniform material supply to public sector.

4.9. Correlation analysis

Correlation analysis, which is used to quantify the association between two continuous variables (e.g., between an independent and a dependent variable or between two independent variables). Regression analysis is a related technique to assess the relationship between an outcome variable and one or more risk factors or confounding variables. The outcome variable is also called the **response** or **dependent variable** and the risk factors and confounders are called the **predictors**, or **explanatory** or **independent variables**. In regression analysis, the dependent variable is denoted "*y"* and the independent variables are denoted by "*x*".

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. The direction of the relationship is indicated by the sign of the coefficient; a + sign indicates a positive relationship and a – sign indicates a negative relationship. Usually, in statistics, we measure four types of correlations: Pearson correlation, Kendall rank correlation, Spearman correlation, and the Point-Biserial correlation.

Under this study, researcher use the Spearman rank correlation (non-parametric test) that is used to measure the degree of association between two variables. The Spearman rank correlation test does not carry any assumptions about the distribution of the data and is the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal.

The Spearman's rank-order correlation is the nonparametric version of the Pearson product-moment correlation. Spearman's correlation coefficient, (ρ, also signified by r_s) measures the strength and direction of association between two ranked variables.

The sign of the correlation coefficient indicates the direction of the association. **The magnitude of the correlation coefficient indicates the strength of the association.**

For example, a correlation of r = 0.9 suggests a strong, positive association between two variables, whereas a correlation of r = -0.2 suggest a weak, negative association. A correlation close to zero suggests no linear association between two continuous variables.

Researcher has conducted the correlation analysis to see the relationship in between the **response** or **dependent variable** and the **independent variables, among the predictors and moderator**. The mean value and the std. deviation received for each variables from SPSS software as follows.

Table 4-40statistics related to all variables

Descriptive Statistics			
	Mean	Std. Deviation	N
coll	4.9375	.24593	32
capa	1.8750	.97551	32
tech	3.3438	.48256	32
quol	3.4375	.50402	32
gvin	1.7812	.55267	32
acce	1.7812	.83219	32
hlsu	4.7812	.42001	32
efef	4.8438	.36890	32

Correlation Coefficient (Spearman correlation) valve received for six independent variables , moderator variable and dependable variable through SPSS software is shown in bellow chart and Spearman's correlation coefficient, (ρ, also signified by r_s) measures the strength and direction of association between two ranked variables. Usually, in statistics, we measure four types of correlations: Pearson correlation, Kendall rank correlation, Spearman correlation, and the Point-Biserial correlation for this study researcher use spearman correlation and reason for selecting spearman is, researcher believing that, there are some variables which may does not have proper leaner relation in practical situation due to specialty of this particular study.

4.9.1. Spearman correlation

Table 4-41statistics related to correlation coefficient and P valve

			coll	capa	tech	quol	gvin	acce	hlsu	efef
	coll	Correlation Coefficient	1.000	.103	-.085	-.293	.134	.292	.176	.600**
		Sig. (2-tailed)	.	.576	.644	.104	.464	.105	.336	.000
		N	32	32	32	32	32	32	32	32
	capa	Correlation Coefficient	.103	1.000	-.113	-.239	.552**	.210	.190	.248
		Sig. (2-tailed)	.576	.	.539	.187	.001	.249	.298	.172
		N	32	32	32	32	32	32	32	32
	tech	Correlation Coefficient	-.085	-.113	1.000	.290	.073	-.051	.224	-.232
		Sig. (2-tailed)	.644	.539	.	.107	.693	.782	.218	.201
		N	32	32	32	32	32	32	32	32
	quol	Correlation Coefficient	-.293	-.239	.290	1.000	-.213	-.367*	.162	-.314
		Sig. (2-tailed)	.104	.187	.107	.	.243	.039	.376	.080
		N	32	32	32	32	32	32	32	32
	gvin	Correlation Coefficient	.134	.552**	.073	-.213	1.000	.133	.348	.140
		Sig. (2-tailed)	.464	.001	.693	.243	.	.467	.051	.446
		N	32	32	32	32	32	32	32	32
	acce	Correlation Coefficient	.292	.210	-.051	-.367*	.133	1.000	-.076	.486**
		Sig. (2-tailed)	.105	.249	.782	.039	.467	.	.678	.005
		N	32	32	32	32	32	32	32	32
	hlsu	Correlation Coefficient	.176	.190	.224	.162	.348	-.076	1.000	.189
		Sig. (2-tailed)	.336	.298	.218	.376	.051	.678	.	.301
		N	32	32	32	32	32	32	32	32
	efef	Correlation Coefficient	.600**	.248	-.232	-.314	.140	.486**	.189	1.000
		Sig. (2-tailed)	.000	.172	.201	.080	.446	.005	.301	.
		N	32	32	32	32	32	32	32	32

Rule of Thumb for Interpreting the Size of a Correlation Coefficient	
Size of Correlation	*Interpretation*
.90 to 1.00 (-.90 to –1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	Little if any correlation

Hinkle, Wiersma, & Jurs (2003). *Applied Statistics for the Behavioral Sciences* (5th ed.).

Figure 4-23 Rule of Thumb for Interpreting the Size of a Correlation Coefficient

As per the above charts, there is no very high positive (negative) correlation or High positive (negative) correlation among the variable, however the highest relationship can be observed in between the variable collaboration and the efficient and effective material supply. Accordingly researcher can say that there is a moderate positive correlation (0.600) between the first variable (collaboration) and study dependable variable. Similarly at the α =0.01 level of significance, let's focus on seven predictors, whether they are statistically significant and, if so, the direction of the relationship. The variable **collaboration** is concerned p- value is indicated as 0.000 means statistically significant relationship among the two variable collaboration and efficient and effective material supply to public sector. When all variables considered, enhancing of collaboration among the DTAC stakeholders may have more impact than the other variables. So the researcher can say that, if DTAC can make their supply chain in a more collaborative manner public sector organization can get the advantage of getting material in an efficiently and effectively .

The capacity improvement is concern; there is a positive moderate relationship with government incentives and capacity. The relevant correlation coefficient value is 0.552 and it shows that, when government invests more and more as a incentives or investment to protectionism of the domestic textile manufactures the capacity of the DTAC supply chain can be enhance further. The p value is indicated as 0.001 means

statistically significant relationship among the two variable capacity and the government incentives. So researcher can say that there is a statistically significance relationship among this two variable and finally it will effected to enhance the efficient and effective material supply to public sector.

The technology improvement and quality is concern; there is a negligible Correlation with other variables. The highest positive correlation coefficient value is 0.290 in between technology and quality. The minimum p value is indicated as 0.107 among the two variable technology and quality, rest of the values are not significance at all. However, From the DTAC regulatory framework, the institutions like SLITA playing a major roll to keep the quality and technology standard of DTAC supply chain. So, Each and every manufactures have to follow-up the similar procedure and maintained the standard throughout the process. Normally product qualities of domestic suppliers are in higher level and they are not allowed to deliver the poor quality goods to public sector. In this study quality of the material and efficient and effective material supply does not have much more impact, because to ensure the quality there are so many measuring criteria's. In the DTAC supply chain,

The p -value for acceptance and efficient and effective material supply is depicted as 0.005 and there is a statistically significant relationship among that variable. So researcher can say that there is a statistically significance relationship among this two variable and finally it will effected to enhance the efficient and effective material supply to public sector

The research moderator variable is concern; p = 0.051 in between higher level supervision and government incentives. Similarly, there is a low positive or negligible Correlation between higher level supervision and other variables. Implementing of higher level supervision for individual organization help to enhance their internal capabilities. However, same individual officer can't influence for other regulatory bodies such as line ministries, ministry of defense, DTAC, TEC, SLITA and treasury. That will be the reason for low correlation coefficient value.

4.10. Interpreting and reporting the output of multiple regression analysis

Linear regression is the next step up after correlation. It is used when we want to predict the value of a variable based on the value of another variable. The variable we want to predict is called the dependent variable (or sometimes, the outcome variable). The variable we are using to predict the other variable's value is called the independent variable (or sometimes, the predictor variable). In this study researcher used more independent variables, rather than just one, so it is better to use multiple regression.

Table 4-42modal summery valve

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.702[a]	.493	.345	.29862
a. Predictors: (Constant), hlsu, acce, tech, coll, capa, quol, gvin				

The "R" column represents the value of "R" the multiple correlation coefficient .R can be considered to be one measure of the quality of the prediction of the dependent variable , in this case efficient and effective material supply a value of 0.702 in this example indicate good level of prediction . the R square column represent R^2 value (also called the coefficient of determination) which is the proportion of variance in the dependent variable that can be explain by the independent variable (technically it is the proportion of variation accounted for by the regression modal above and beyond the mean modal) in this case .493 that our independent variables explain 49.3% of the variability of study dependent variable, efficient and effective material supply.

4.11. Statistical significance

This ANOVA table indicate that the regression modal predict the dependent variable significantly well. So, by looking at the regression raw and go to the sig column we can see the statistical significance of the regression modal that was run. Hear P<0.013 which

is less than 0.05 and indicate that, overall, 98.7% sure that the regression modal statistically significantly predict the outcome variables (it is god fit for the data)

Table 4-43statistics related to ANOVA valve

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.079	7	.297	3.330	.013[a]
	Residual	2.140	24	.089		
	Total	4.219	31			
a. Predictors: (Constant), hlsu, acce, tech, coll, capa, quol, gvin						
b. Dependent Variable: efef						

4.11.1. Statistical significance of the independent variables

Researcher used test for the statistical significance of each of the independent variables. This tests whether the unstandardized (or standardized) coefficients are equal to 0 (zero) in the population. If $p < .05$, you can conclude that the coefficients are statistically significantly different to 0 (zero). The *t*-value and corresponding *p*-value are located in the "**t**" and "**Sig.**" columns, respectively, as highlighted below: You can see from the "**Sig.**" column that all independent variable coefficients are statistically significantly different from 0 (zero). Although the intercept, B_0, is tested for statistical significance, this is rarely an important or interesting finding.

Table 4-44-statistics related to regression analysis

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.910	1.355		.672	.508	-1.887	3.707
	coll	.703	.240	.469	2.935	.007	.209	1.198
	capa	.022	.079	.059	.281	.781	-.141	.185
	tech	-.133	.122	-.174	-1.087	.288	-.386	.120
	quol	-.039	.128	-.053	-.302	.765	-.303	.225
	gvin	-.040	.141	-.059	-.280	.782	-.331	.252
	acce	.121	.073	.273	1.667	.109	-.029	.271
	hlsu	.178	.148	.203	1.204	.240	-.127	.484
a. Dependent Variable: efef								

H1: Collaboration among the stakeholders in supply chain is positively related to Efficient and Effective material supply through DTAC

$H0_i$: No relationship between Collaboration among the stakeholders in supply chain and Efficient and Effective material supply through DTAC

When consider the regression chart depicted above, the collaboration (coll, b=703 p=.007) is significant and its coefficient is positive indicating that grater the collaboration among the DTAC stakeholders enhance the efficiency and the effectiveness of DTAC material supply to public sector. The significant value is less than the 0.05. Since p value is less than 0.05, null hypothesis is rejected while accepting the alternative hypothesis. This comes to the conclusion that there is a significant influence between Collaboration among the stakeholders in supply chain and Efficient and Effective material supply through DTAC

H2: Further expansion of production capacity, Processing/Production infrastructure is necessary to enhance the Efficient and Effective material supply through DTAC

$H0_i$: Further expansion of production capacity, Processing/Production infrastructure is not necessary to enhance the Efficient and Effective material supply through DTAC

When consider the regression chart depicted above, the capacity (capa, b=0.022 P=.781) is not significant and its coefficient seems to be unrelated to efficient and effective material supply from DTAC to public sector. The significant value is more than the 0.05 mean the alternative hypothesis is not in acceptable level and in this situation researcher can accept the null hypothesis (HO_i) while rejecting the alternative Hypothesis. Simply it is ensure that, further expansion of production capacity, Processing/Production infrastructure is not necessary to enhance the Efficient and Effective material supply through DTAC. The reason is the existing capacity is sufficient enough to cater the existing Demand.

H3: Expenses related to Quality improvement is positively related to Efficient and Effective material supply through DTAC

HO_i: There is no relationship between further Quality improvement and Efficient and Effective material supply through DTAC

When consider the regression chart depicted above, quality (quol b= -0.039 P=.765) is not significant and its coefficient is negative which would indicate that further enhancement of quality related expenses reduced the efficiency and effectiveness of the existing process. The significant value is more than the 0.05 mean the alternative hypothesis cannot accepted and in this situation researcher can accept the null hypothesis ($HO_{i..}$ There is no positive relationship between further Quality improvement and Efficient and Effective material supply through DTAC

H4: There is a relationship between technology and Efficient and Effective material supply through DTAC

$H0_i$: There is no association of latest technology and Efficient and Effective material supply through DTAC

When consider the regression chart depicted above, the Technology (tech,b=-0.133 P=.288) is not significant and its coefficient is negative which would indicate that further enhancement of technology reduced the efficient and effectiveness of the process. The significant value is more than the 0.05 mean the alternative hypothesis is not in acceptable level and in this situation researcher can accept the $HO_{i:}$ Further enhancement of Technologies is not positively related to Efficient and Effective material supply through DTAC and therefore there is no association of latest technology and Efficient and Effective material supply through DTAC. The reason is the existing technology of the most of the manufactures is sufficient enough to cater the existing Demand.

H5: Textile sector growth and efficient and effective supply to public sector is dependent on Government activities.

$H0_i$: The government activities are negatively influence for Domestic textile sector Growth.

When consider the regression chart depicted above, the government incentives (gvin b= -0.040 P=.782) is not significant and its coefficient is negative. The significant value is more than the 0.05 mean the alternative hypothesis is not in acceptable level and in this situation researcher can accept the $HO_{i:}$ Existing Government incentives, protectionism to investment flow have not positive influence on efficiency and effectiveness of material supply and Growth of textile sector, efficiency and effectiveness of material supply is also independent from Government incentives , protectionism to investment flow. The reason is the most of the government activates are not positively affected for the growth of the industry

H6: There is strong relationship of acceptance, competency and skilled human resource on textile sector growth and efficient and effective supply

$H0_i$: Quick acceptance, competency and skilled human resource have no impact on textile sector growth and efficient and effective supply

When consider the regression chart depicted above, acceptance (acce b= 0.121) is not significant (P=.109), but only just so, and its coefficient is positive which would indicate that quick acceptance resulted to minimized the lead time gap and it automatically

improve the efficiency and effectiveness of the existing process. The significant value is more than the 0.05 mean the alternative hypothesis is not in acceptable level.

In a practical scenarios, improvement of quality, enhancement of technology, expansion of capacity, government activities are positively affected for the final output of any kind of manufacturing process. But in this DTAC process is concerned, enhancement of above input may impact to increase the cost of the process and it negatively influence for the efficient and effective material supply to public sector.

CHAPTER 5

5. DISCUSSION, RECOMMENDATION AND CONCLUSION

5.1. Discussion

With the implementation of DTAC procedure, since 2005, the public sector organizations have to purchase their annual uniform material requirement only from DTAC. The process is very long and there are many regulatory bodies during the process. The standard lead time of the DTAC purchasing process is approximately 429 days and it is proven that DTAC process is not capable to meet this and the actual lead time is 500 to 600. Most of the cases, the Manufacturing lead time of this process is less than the agreed schedule date and delivery lead time is also less than the schedule. Problem is the processing or administrative lead time. There are some factors which can influence the efficiency and effectiveness of the DTAC material supply to public sector. Researcher critically analyzed these factors in chapter 4 and out of that the first variable "collaboration among the stakeholders" has been identified as most significant element. There are so many stakeholders involvement in this process, so integration among the stakeholders is very important to enhance the domestic textile growth. So, Appointing of project managers, implementing of ERP base information shearing system, coordination and high integrations are the kind of action can be taken to minimized the impact related to this problem.

In the normal system, Improvement of technological aspect, introducing of new machines, opening of new factories, will positively influence for the textile sector growth. However, in DTAC process the existing technology is sufficient enough to cater the existing Demand; most of the factories are with over capacity due to non-receipt of school uniform to the DTAC since 2015. Factory owners are not getting sufficient quantity of demand from public sector to run their factories throughout the year and manufactures are restricted to entering in to export market and to get BOI facility too.

Similarly, in normal run improvement in capacity of the domestic manufactures also not required in this juncture to meet existing public sector Demand and most of the textile manufacturers are with over capacity. The government came in to power since year 2005

to 2015 had done lot of improvement to this sector and most of the domestic manufactures invested their wealth to open new factories, enhance the technology, improvement of capacity and quality of the material requirement of public sector. However, after 2015 Government has taken decision to purchase the school uniform requirement other than DTAC process and the annual requirement is above two million of fabric meters. In the same time military and the police also decided to purchase their uniform material from open market due to lead time issues in DTAC process. This was negatively influence for the growth of local textile sector. The quality of the material is very much important and Institution like SLITA is playing major roll to keep the quality standards and Quality improvement is measured with four indicators. Those are; development of specifications, testing methods, nature of quality certifications received and new production lines added to substitute imported materials. The SLITA uses internationally accepted testing methods for the testing of state sector uniform materials purchased through the DTAC. The SLITA Laboratory has accredited by ISO 17025. The standards used for testing of uniform materials are ISO, Amd and BS. The internationally accepted testing methods provides good quality uniform materials to end user. As an example, reason development of domestic manufactures, improved their machine efficiency as follows to meet the public sector demand while satisfying the user's expectation.

Table 5-1- Efficiency of machines

Purpose	**Machine- 2010**		**Machine- 2018**	
	Type of machine	**Efficiency**	**Type of machine**	**Efficiency**
Weaving	Shuttle loom	0.5-1 meter Per hr	Air Jet	12 meter per Hr.
Dying	Small Jiggers	500meters per batch	Jumbo Jiggers	700-900 meters per batch
Warping	Manual	No indication on Yarn breakage	Fully automatic with sense	Indicate yarn breakage
Sizing	Manually rotary by the yarn	Tend to damage Yarn	Gear motor type machines	No damages to yarn

Source-: SLITA capacity analysis reports

DTAC purchasing process is concerned, Government has to play major roll and one way the government policy itself is an incentive to the local textile industry because it gives a preference to the local manufacturers. To empower the domestic textile sector growth, government has used several policy instruments to implement the policy of empowering the local textile industry.

Acceptance is concerned, this is the only variable which public sector organization can control, and the quick acceptance will minimize the lead time gap. However, the non-availability of basic textile testing facility, limited storage facility, and non-availability of qualified personnel for fabric testing may delay the acceptance and negatively influence for efficient and effective material supply.

During the study, Researcher has taken a higher level supervision as a moderate variable for this study and if government agencies can appoint high rank knowledgeable person as a supervisor to monitor this DTAC purchasing process, he can influence to improve, as well as to utilize the capacity, collaboration, quality, technology and government support. Finally, it may result to enhance the efficient and effective material supply to public sector. However, in this DTAC supply chain there are lots of involvements in between government agencies. The officer appointed to supervise the process can control the internal arrangement and external arrangements are beyond the controllable area of the appointed person. During the analysis the higher level supervision has not given strong significant value and reason is the power of influence to outside bodies like treasury, line ministries and etc.

Considering all, researcher can say that, to empower the domestic manufactures government has to play bigger roll and more attention to be given to develop basic infrastructure facilities, the policy decisions are to be taken in a favorable ground to empower the industry. DTAC has to work more collaborative manner to develop the integrations among the stakeholders at all level. The technical evaluation committees and tender committees should allocate adequate quantity to each and every supplier to continue their production throughout the year. Idling situations to be minimized by providing adequate demand. DTAC should convince the government to take the action to re-purchase the school uniform requirement from Domestic suppliers through DTAC.

5.2. **Recommendations**

a. To nominate qualified senior officer from each services to supervised the DTAC process & to improve the Collaboration among the stakeholders

b**.** Arrangement to be made to implem**ent** ERP base relationship among the stakeholders to share the information

c. Improve the link exist between testing institution and user department.

d. Appointing of qualified person as a project manager of DTAC process

e. Arranging of Brainstorming sessions, Regular progress review meeting, and enhancement of knowledge sharing facilities

g Improve the Supply chain integration along the DTAC supply chain

h Make arrangement to Provide adequate quantity of material demand to all manufactures to being survive in the local textile manufacturing industry.

J Make arrangement to fully utilization of existing machine and their capacity to minimized the cost.

k. Make arrangement to minimize the cost by fully utilization of existing manpower.

l Get more assistance from SLITA for improvement of material specification, valve addition, productivity and etc. to enhance the quality of material

m DTAC should make arrangement to improve the **customer focus to** expand the customer base and repeat business in future.

n Make arrangement to get proper **engagement of people** at all level to enhance it capabilities to create quality and deliver value.

o Improvement in **process approach** to optimized performance through effective process management ,efficient use of resources and reduced cross functional barriers related to quality improvement

p DTAC should practice **evidence based decision making** process to increased ability to review, challenge and change opinions and decisions related to obtain best quality product from Local manufactures.

q. Arrange proper system to check the **quality of raw material imported** by the DTAC suppliers.

r Improve the Information technology to increase organizational productivity, flexibility, competitiveness and stimulate the development of inter-organizational networks.

s. Government should increase the incentives and protectionism and infrastructure facilities to empower the domestic textile industry.

t Government should implemented only the favorable tax policy, rules and regulations for the growth of the Domestic textile sector

u Public sector organization should invest money to provide adequate basic testing facility, adequate professionalism, measuring equipment and proper warehouses to expedite the acceptance process.

V Make arrangement to apply proper Performance Measurement system

w. Make Arrangement to adhering of annual procurement budget plan

z Go for the long term contract agreement with foreign buyers to minimized the effects of Dollar rate fluctuation.

aa Make strong relationship with yarn manufactures to get the yarn required for manufacturing of fabric.

ab Government should arrange liquidity to open Local letter of Credit on time to confirmed the orders to suppliers

ac Public sector organization should have proper demand management system to give exact quantity required for them for the forthcoming year.

ad **Plant within a Plant** (PWP) concept to be implement for yarn manufacturing purposes to minimized the delays from imports to minimized the lead time of the total process

5.3. Conclusion

The public sector of Sri Lanka is concerned, Purchasing of uniform material through DTAC is a must and the lead time of this process is very higher than the normal government procurement method due to lot of people and process involvement. Non availability of material is punishable offence and over purchases also a matter when auditors visited to do their job. The approximate lead time of DTAC process is over 500 days and to face this lead time issue public sector organization have to maintained at least two years of buffer stock. Limited warehouse facility is the barrier for bulk purchases and it may restricted the warehouse space for the other essential items and if logisticians commence it, alternative problems will arrives and result of it may worse than the stock out situation. In the first chapter researcher has discuss all the problems which related to this issue and during the chapter two researcher discuss the literature related to this study area including related modals and framework. In chapter three, under the research methodology researcher discusses how to prove or disprove research hypothesis, and way he do it. During the fourth chapter researcher analyzed all primary and secondary dada to see the impact of independent variable on research dependable variable and it significant and reason for rejecting or accepting of alternative or null hypothesis.in fifth chapter , researcher discuss the findings and mentioned the relevant recommendations to overcome this issue. Further, due to limited upper limit of word count allocated for this study, researcher make arrangement to kept some important data , information and part of the analysis as annexures to this paper.

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Appendix – A

DTAC Purchasing process

DTAC purchasing process is comprise with 13 steps and minimizing lead time of each individual step is important to minimized Total lead time. As such researcher critically analyzed the situation through direct interview; Discussions with key members of DTAC and SLAF Official to what action can takes to minimize the lead time gap. During the study researcher realized that lack of Collaboration among the stakeholders as one of leading reason for this lead time issue. To identify the Lead time gap of each step, researcher collect the details relevant to DTAC purchase process since 2014 to 2018.

During the study, researcher observed that Public Sector Organization are getting more time period to provide their Annual requirement of clothing items to DTAC. To minimized lead time of 1st step of DTAC purchasing process (The Demand Management), Public sector organizations have to prepare their forthcoming year requirements considering stock availability, last year consumption and annual stock revive reports without waiting the DTAC official request letter comes. Then only, DTAC can obtain the requirement in shorter time period to progress the next step. In year 2017 SLAF has responded to the DTAC request letter within 18 days and SLAF material requirement has given to DTAC 12 days prior to schedule time allocated for first step. What researcher observed during the study is, DTAC cannot take action against the individual demands comes from each organization and DTAC has to wait until all the public sector organizations demands arrived to them to prepare annual DTAC demand. So Coordination among Stakeholders is very much important to get all individual demand as per schedule.

During 2nd step "TEC appointing stage". DTAC request TEC members from respective services. Public sector organizations have to appoint an officer having fair knowledge on DTAC purchasing activities as a member TEC. As per the Tender document available at DTAC, In year 2017 DTAC has appointed TEC members within 11 days and three days prior to schedule.

During the 3rd step " Preparation of annual demand for forthcoming year & get approval from TEC and then DTAC". In this stage, to prepare annual demand of public sector organization, DTAC required the material requirement of all organization. If one organization fails or delayed their confirmation of requirement, it will effected to delay the preparation of entire demand. So public sector organization has to complete their in house jobs before the DTAC request letter comes to prepare annual demand of all public sector organization. After preparing of annual demand it should approved by TEC members and DTAC officials. In year 2017 this approval has taken within 14 days and prior to 7 days from the schedule.

During the 4th steps "Invitation of Bids" DTAC should go through the all specification given by the state sector organization with the help of SLITA. Because, errors in specifications effects for final quality of final product. Due to in completed specifications the manufactures produced wrong samples and correcting them after the MPC approval is not a easy task. Further, DTAC should have proper idea on suppliers capabilities, capacity and last years performance before sending quotation for them. During the study researcher founds that, In year 2017 to invite bids from DTAC registered suppliers DTAC takes 26 days and there is a 12 days delay from schedule date.

During the 5th Step "Bid opening and Scheduling of quotations" all supporting documents such as bid bond, samples, and other relevant information to be included to support for Technical Evaluation Committee. During the study researcher founds that, In year 2017 for Bid opening and Scheduling of quotations DTAC takes 21 days and there is a 7 days dellay from schedule date.

During the 6th step "Releasing of File for evaluation and sending of Samples for testing at SLITA" . All samples to be check to confirmed whether they are according to the specification. All not suitable samples to be identified and manufactures of that samples should not taken for further evaluation. SLITA has to play their roll in this stage and they have to find the best among the best to provide better quality materials to public sector organization. During the study researcher founds that, In year 2017 for DTAC send all sample to SLITA Just after three days from bid opening and Scheduling.

During the 7th step “Evaluate of tenders , capacity analysis by SLITA technicians, price negotiation, and allocation of material” To minimized lead time in this stage TEC has to complete the evaluation as soon as possible and they have to well coordinate among the supporting agencies such as DTAC, SLITA, Ministry of industry and commerce to finalized the proper evaluation report. The capacity analysis reports of SLITA technicians and audit reports of DTAC official members to be use when material quantities allocating for domestic textile manufactures. During the study researcher founds that, In year 2017 to Evaluate of tenders , capacity analysis by SLITA technicians, price negotiation, and allocation of material DTAC takes 49 days and there is a 4 days delay from schedule date.

During the 8th step “To get Respective Ministers approval and CTB approval” to minimized the lead time gap, respective ministers have to get the CTB approval for their purchases within shortest time period. However researcher observed that, Getting CTB approval is time consuming event. During the study researcher founds that, In year 2017 to get Respective Ministers approval and CTB approval DTAC takes 30 days and it is 30 days prior to schedule date.

During the 9th step “Document H/O respective services (tender approval letter, Bid bond , sample and SLITA test reports)” to minimized lead time of this stage DTAC should have more coordination with a relevant users and instruction to be issued to collect the document as soon possible to prepare contract agreement. During the study researcher founds that, In year 2017 to hand over Document to respective services (tender approval letter, Bid bond , sample and SLITA test reports) DTAC takes 142 days and there is a 121 days gap from schedule date.

During 10th step “Issue a letter of award to manufacture and request performance bond , obtaining of proper sample and colour matching with existing material available.” To complete this stage respective services getting more time period and minimizing of lead time of this stage is very much important to minimized Total lead time gap of this DTAC purchasing process. This is out of DTAC control and respective services have to issue a Standard Operation Procedure to expedite the activities under their control to get complete the task. During the study researcher founds that, In year 2017 SLAF takes 8

days to Issue a letter of award to manufacture and request performance bond from them and it is 22 days prior to schedule date.

During step no 11th "Signing of contract agreement, Order confirmation and opening of Local LC" To complete this stage public sector organization takes more time period and to minimized that time gap Organization has to get in to a contract agreement including all parameters to build proper bond in between buyer and seller . Local LC is the newly introduced facility and coordination among bank, manufactures and organization is required to expedite the process. During the study researcher founds that In year 2017, for Signing of contract agreement, Order confirmation and opening of Local LC lead time gap is more than 136 of days and as per the schedule it has given only 30 days

Next step (12th) is "Manufacturing of items at manufactures end and delivering them to users warehouse " To minimized manufacturing lead time, all manufactures have been empowered during last 15 years and every manufactures are capable enough to manufacture the material require for public sector organization. However, some manufactures fails to deliver their potion during the time allocated for them as per contract agreement. Even they have fully capacity to provide uniform material requirement of Public sector organization , manufactures fails to deliver small portion of material allocated for them. During the study researcher founds that, In year 2017 out of 6 material all materials were supplied to SLAF within the schedule time allocated for manufactures

Last step of DTAC purchasing process is "Quality acceptance & item BOC process at SMD and confirmation of acceptance to bank and the supplier" Minimizing of lead time during item acceptance is very much important when total lead time concerned. However, due to lack of Storage facility, material measuring equipment and Qualified manpower at R&D it is difficult to minimized the lead time in this stage.

Appendix "B'

SHORT NOTES OF INTERVIEW WITH

VICE CHANCELLOR KDU AND FORMER DIRECTOR LOGISTIC SLAF

QUESTIONS POSED AND ANSWERS RECEIVED

1. **Personal Particulars**

a.	Rank	AVM
c.	Name	SAGARA KOTAGADENIYA
d.	Branch	GDP
e.	Parent Unit	KDU
f.	Period of service	32 Years
g.	appointment	vice chancellor former director logistics SLAF

2. Do you aware of DTAC purchasing process?
3. How many years of experience you have about this process.
4. What type of difficulties you faced because of this purchasing method .
5. Don't you thing that through higher level supervision we can reduced the said difficulties.
6. Don't you think that further enhancement of factories capacity like new machines , more manpower and use of latest technology can be minimized the said difficulties?
7. Do you suggest any improvement to be implemented to sole this problem.
8. Even with this difficulties Why don't you order from the kit issue requirement through normal government purchasing scheme
9. As you aware, Quantity allocated for each supplier through DTAC is sufficient to run the factories without machine idling situation through out the year.
10. As per my research findings, most of the factory owners are not fully utilizing their capacity due to lack of orders from DTAC and they are prohibited to get the outside orders from BOI registered company too. So, do you think that this delay is occurs due to problem of factories . In the event of not approval, what can we do about to improve the present system?

11 As per your experience , Why the factories fail to deliver the material within the contract given time to all public sector organization they got orders.

12 What have you think about the quality of the material getting from DTAC.

13 Don’t you think that the delay occurs due to unwanted steps in this process.

14 Don’t you think that, by appointing Qualified senior officer as a overall coordinator or project manager and appointing of team (from respective user agencies) to monitor the entire process is a good solution for all this issues.

15 What else do you have to tell?

Appendix "C"

ESEARCH QUESTIONNAIRE

Please note that the appended questionnaire has been prepared by Wing Commander PAP Priyadarshana, a student of MBA in Supply Chain Management Department of Transport and Logistics Management – University Of Moratuwa. All answers that you provide will only be used for the purpose of conducting a field research any data or statement that is stated / declared in this regard will not divulge any personally identifying information. The confidentiality of your information is highly ensured. Therefore, officers are requested to answer all the questions as genuinely and accurately as possible.

SECTION 1 : GENERAL INFORMATION

In this section I would like to know about your company in general

1. Name (Optional):…….

2 Your job designation

……

3 Location of your organization:…….

4 Please indicate type of your organization:…….

Manufacturing	☐
Service	☐
Other	☐

5 Years of experience you have about the DTAC process

Less than 5 years.	☐
5 – 10 years.	☐
10 – 15 years.	☐
More than 15 years .	☐

6 Please indicate size of your company in term of employees:

Less than 5 employees. ☐

5 – 50 employees. ☐

51 – 150 employees. ☐

More than 150 employees. ☐

7. Please indicate the geographic scope of your company's operations:

a. Local ☐

b. Regional ☐

c. Worldwide ☐

SECTION 2: FACTORS INFLUENCING FOR DTAC SUPPLY

In this section, researcher is trying to measure the factors influencing for efficient and effective supply of uniform material through Domestic textile allocation Committee (DTAC). please indicate the degree of your agreement with the following statements by circling the appropriate number against each question using the scale bellow

1	2	3	4	5
Strongly disagree	Disagree	Natural	Agree	Strongly agree

Q/ N	Collaboration	Degree of agreement				
1	Collaboration among the stakeholders can be improved by nominating senior officer as a supervisor from each services	1	2	3	4	5
2	Non availability of proper ERP base relationship among the stakeholders is the reason for the delay of material.	1	2	3	4	5
3	There is no proper link exist between testing institution and user department at present to expedite the material supply.	1	2	3	4	5
4	Appointing of qualified person as a project manager of DTAC process will effected to minimized lead time	1	2	3	4	5

	gap and efficient and effective supply of material					
5	There is no proper link exist between users, Domestic textile allocation Committee DTAC), Sri Lanka Institute of Textile and apparel (SLITA), Ministry of Defiance (MOD) (treasury and the cabinet to expedite the existing DTAC process	1	2	3	4	5
6	Brainstorming sessions, Regular progress review meeting, and enhancement of knowledge sharing facilities will improve the collaboration	1	2	3	4	5
7	Collaboration minimized the bullwhip effect and minimized the inventories along the supply chain	1	2	3	4	5
8	Supply chain integration maximized the efficiency of conducting activities along the DTAC supply chain	1	2	3	4	5
	Capacity	Degree of agreement				
9	**All domestic manufactures** are getting adequate quantity of material demand from DTAC to being survive in the local textile manufacturing industry.	1	2	3	4	5
10	The existing machine availability at domestic factories are not sufficient enough to supply the annual demand allocated for them,	1	2	3	4	5
11	In the existing DTAC Process, Capacity improvement through **opening of new factories** are essential for all suppliers and then only they can deliver the material to public sector on time.	1	2	3	4	5
12	There is a requirement of **enhancing the existing manpower** of leading domestic factories by recruiting additional employees.	1	2	3	4	5
13	Quantity allocated for each manufacture from DTAC is justifiable and all domestic suppliers gets adequate demand to run their factories throughout the year without **machine idling situation.**	1	2	3	4	5
14	Existing capacity of the most of domestic manufactures are sufficient enough to fulfill the total public sector demand allocated for them within the agreed period & without liquidity damages.	1	2	3	4	5
	Quality	Degree of agreement				
15	In the existing DTAC process, testing institutions are helping for the **Improvement** of the material specification, valve addition, productivity and etc. to enhance the quality of material supply to public sector	1	2	3	4	5
16	If DTAC improve the **customer focus** it will help to expanded the customer base and repeat business in future.	1	2	3	4	5

17	**leadership** can enhance the Quality of production to meeting organization's quality objectives	1	2	3	4	5
18	In the existing DTAC process, there are proper **engagement of competent, empowered, and engage people** at all level throughout the process to enhance it capabilities to create quality and deliver value.	1	2	3	4	5
19	Improvement in **process approach** will help to optimized performance through effective process management ,efficient use of resources and reduced cross functional barriers related to quality improvement	1	2	3	4	5
20	The DTAC is practicing **evidence based decision making** process to increased ability to review, challenge and change opinions and decisions related to obtain best quality product .	1	2	3	4	5
21	Existing **Relationship management** of DTAC and their stakeholders is sufficient enough to increase capability to create valve for interested parties by sharing recourses and competence and managing quality related risk.	1	2	3	4	5
22	In the DTAC process, there is no proper system to check the **quality of raw material imported** by the DTAC suppliers which has direct influence to the Quality of the final product .	1	2	3	4	5
23	Quality is positively correlated to the textile growth	1	2	3	4	5
	Technology	Degree of agreement				
24	The existing technology is sufficient to plan, design, develop, produce, deliver and support good and service to meet customer need and expectation	1	2	3	4	5
25	There is a requirement of opening of new factories to cater the existing public sector demand	1	2	3	4	5
26	In the existing process, The up- to- date technology with efficient machinery use by the all DTAC suppliers is highly appreciated by public sector organization and also helpful to meet demand on time.	1	2	3	4	5
27	Technological improvement like, Innovative information technologies have the capacity to impact organizational structure, firm strategy, communication exchange, operational procedures, buyer– supplier relationships, and bargaining power.	1	2	3	4	5
28	Information technology may also increase organizational productivity, flexibility, competitiveness and stimulate the development of inter-organizational networks.	1	2	3	4	5

29	Up to date technology can enhance the value addition and positive pressure on textile sector growth	1	2	3	4	5
	Government incentives	Degree of agreement				
30	The existing incentives and protectionism given to DTAC Suppliers by the Governments of Sri Lanka is an adequate to empower the domestic textile industry.	1	2	3	4	5
31	Unfavorable tax policy, rules and regulations implemented by the governments on time to time (such as purchasing of school uniform from outside the DTAC) was one of the reason for the poor growth of the Domestic textile sector	1	2	3	4	5
32	Government does not required to provide more infrastructure facilities to empower the local textile sector.	1	2	3	4	5
33	The treasury is capable to provide adequate Budget/Liquidity on time for Providing of Local Letter of Credit facility to local manufactures	1	2	3	4	5
34	Existing Government has regulated proper policy , principles and government regulations in regard to textile sector empowerment.	1	2	3	4	5
35	The existing government is having proper interest to develop this DTAC Purchasing Process	1	2	3	4	5
36	Government Incentives and protectionism can not influence for the empowerment of local manufactures and it effected for on timely delivery	1	2	3	4	5
	Acceptance	Degree of agreement				
37	Quick acceptance will not help to reduce the delivery lead time	1	2	3	4	5
38	Adequate basic testing facility and measuring equipment are available at the respective services warehouses to expedite the acceptance process	1	2	3	4	5
39	There are adequate professionalism in the R &D sections to check the quality of the material and acceptance of material at R&D site of the respective services.	1	2	3	4	5
40	The limited storage facility available at public sector organizations warehouses will increased the time for acceptance and it enhance lead time gap.	1	2	3	4	5
41	Public sector organization are wish to investing adequate money for the improvements of internal material acceptance process	1	2	3	4	5
	Higher level supervision	Degree of agreement				
42	Higher level supervision is essential element to	1	2	3	4	5

	minimized the lead time gap and improve the efficiency & effectiveness of the DTAC process					
43	Higher level supervision is essential element to improve the coordination among the DTAC stakeholders	1	2	3	4	5
44	Higher level supervision is essential element to Enhance the capacity of DTAC suppliers	1	2	3	4	5
45	Higher level supervision is essential element to improve the quality of the material supply through DTAC	1	2	3	4	5
46	Higher level supervision is essential element to improve the technology and improve production efficiency and effectiveness of domestic manufactures	1	2	3	4	5
47	Higher level supervision is essential element to obtain government support for DTAC Stakeholders	1	2	3	4	5
48	Higher level supervision is essential element to minimize the delays in acceptance at users warehouse	1	2	3	4	5
	Efficiency and effectiveness	Degree of agreement				
49	Efficiency and Effectiveness of the process can be improved through proper collaboration among the stakeholders	1	2	3	4	5
50	Efficiency and Effectiveness production can be improve by enhancing the capacity	1	2	3	4	5
51	Efficiency and Effectiveness can be improved by upgrading the quality	1	2	3	4	5
52	Efficiency and Effectiveness can be improve through Technology innovations	1	2	3	4	5
53	Efficiency and Effectiveness can be improve through supplier relation	1	2	3	4	5
54	Efficiency and Effectiveness can be improve through Quick acceptance	1	2	3	4	5
55	Efficiency and Effectiveness can be measured using Standard Lead time.	1	2	3	4	5
56	Efficiency and effectiveness can be increase by applying proper Performance Measurement system	1	2	3	4	5
57	Efficiency and effectiveness can be increase By adhering to annual procurement budget	1	2	3	4	5
58	Delays in raw material supply for DTAC Manufacturing process affected for efficiency and effectiveness of supply	1	2	3	4	5
59	Delays in material supply for the production occurs due to dollar rate fluctuation	1	2	3	4	5
60	Efficiency and Effectiveness of production is based on yarn availability at foreign suppliers	1	2	3	4	5

The questions in the survey may not be all embracing and comprehensive and may not therefore have afforded you an opportunity to report something you may have wanted to say about your company or department. Please make any comments needed in the space provided bellow.

……
……
……
……
……
……..

Lastly, I sincerely appreciate your time and cooperation. Please check to make sure that you have not skipped any question unwillingly. After completion please seal it and leave with your secretly. I will collect it in a week's time

Thank you

Appendix “D”

Article peng 2009 page no 593. The develop diagram

Appendix “E”

The questionnaire No 2

Details for industry analysis of DTAC

Please note that the appended charts has been prepared by Wing Commander PAP Priyadarshana, a student of MBA In Supply Chain Management Department of Transport and Logistics management – University Of Moratuwa. This details will be helpful for me to see the relationship between the capacity enhancement of the respective companies vs production output. All answers that you provide will only be used for the purpose of conducting a field research to produce My Case Study . Any data or statement that is stated / declared in this regard will not divulge any personally identifying information. The confidentiality of your information is highly ensured.

COMPANY NAME:

MACHINE AVAILABILITY

TYPE OF MACHINE	2014	2015	2016	2017	2018
Air Jet Machines					
RapierTowelVamatexHigh Speed					
Sizing Machines					
Singing And Desizing					
Saurer 500 Rapier					
Direct Warper					
Section Warper					
Singing And Desizing					
Mercerizing Machine					
Bleaching Machine					
CylinderDryer(Separate)RelaxDryer					
Cold Pad Batch Dying Machine					
Jambo Jigger					
Small Jigger					
J.T Machine (Bleaching Unit)					
Jet Machine					
Rotary Printing Machine					
Finishing Stenter (06 Chamber)					
Rolling Machine					
Single Folder Machine					
Airjet towel Machine					
Shuttle Towel Power Loom					

Shuttle Fabric Power Loom					

Electricity Consumption of four Uniform Manufacturers(units and Rs value)

Manufacturer	**2014**	**2015**	**2016**	**2017**	**2018**
M/S Vanguard Industries					

Note: Electricity bill reduced from end 2015 due to cease of manufacture of school uniform fabric.

Water Consumption of four Uniform Manufacturers

Manufacturer	**2014**	**2015**	**2016**	**2017**	**2018**
M/S Vanguard Industries					

Note: We use natural well water in our factories as supply of water from the Water Board is not sufficient for our process.

Production in mtrs

Manufacturer	2014	2015	2016	2017	2018
M/S Vanguard Industries					

Note: Rate of Production reduced from end 2015 due to cease of manufacture of school uniform fabric.

CAPACITY of Production in METERS

Manufacturer	**2014**	**2015**	**2016**	**2017**	**2018**
M/S Vanguard					

New factory opened

……No……..

Appendix “F”

Modal for research designing