III. METHODOLOGY

For the effective conduct of this study, the researcher adopted two types of research techniques. One is diagnostic in nature (based on secondary data) and other is descriptive in nature (based on primary data). A detailed discussion of the research methodology adopted by the researcher on impact of quota liberalization and global economic crisis on textile and clothing trades is presented in this chapter.

A. Selection of the topic
B. Selection of the sample
C. Data Base of the study
D. Theoretical underpinnings
E. Tools of analysis
F. Concepts and definitions used for the study
G. Limitations of the Study

A. SELECTION OF THE TOPIC

Developing countries in the global textile and clothing value chain have been beset by two major issues in recent years: the MFA phase-out of the quota system in 2005, which provided access for many poor and small export-oriented economies to the apparel markets of industrialized countries, and the current economic crisis that has lowered demand for apparel exports and led to massive unemployment across the industry's supply chain. On the one side, trade following the expiry of the quota system is still in a state of flux, notwithstanding the passage of more than five years.

The results, facts and statistics available so far are mixed and this area is expected to undergo numerous changes as countries adapt themselves to "free" trading in T&C. However, the T&C sector is still not truly "free" from trade distortion which now occurs through tariff, non-tariff barriers and trade remedies such as safeguards and anti-dumping. As trade in T&C continues in the quota free era, conflicting interests and the critical
importance, this sector holds for countries and, basically, millions of people in this world (directly and indirectly) makes it an ideal topic for research.

In a supply-constrained region like South Asia, promoting exports has always been a challenge, particularly when trade has been severely restricted by lack of external demand. Developing Asia will continue to suffer from demand decline in USA, EU and other countries, with the People’s Republic of China and India being the most harmed. Though South and Southeast Asia face reduced T&C exports to the USA and EU countries, their exports are also reduced significantly to other Asian exporters, demonstrating the indirect trade linkages that now exist in the global economy. Therefore, the past export slowdown surely has some long-term implications for trade and industrial development.

The Indian garment industry records the momentous growth over the past three and half decades. India being the world’s tenth largest exporter of apparel relies heavily on its exports to sustain its identity. The reason behind this may be unchanging increase in demand in international market for garments, particularly knitted garments from India. Though the knitwear garment industry caters to the needs of the consumers in international market, this industry is not an exception to problems.

It faces many critical problems such as labour, finance, production, market, infrastructure, Government regulations, archaic technology, competition and the like. As a result of which the overall performance of the knitwear industry is affected. In addition to this, the implications of the phasing out of the Multi Fibre Arrangement (MFA) and removal of quota under the WTO’s Agreement on Textiles and Clothing in global textile market, forced the exporting units to equip themselves to meet the competition and develop competitiveness. Due to the removal of quota system the industry lost its assured market and has to struggle hard to capture a place in the competitive market.

Before the abolition of the Quota system, the Multi-fibre Arrangement (MFA) was in force. Under the MFA the quota was determined for the
importing country and every importing country had the limit for their import of garments from India. With the abolition of the Quota System (w.e.f. 1.1.2005) under the WTO's Agreement on Textiles and Clothing (ATC), the assured market for the Indian garment exporters was lost and the competition from the developing countries like China, Bangladesh, Taiwan, Pakistan and Sri Lanka and the like started increasing. As a result of this and being unable to quickly adjust to the technological and other changes, many of the exporting units from Tirupur closed their business. These problems pose serious threat to the knitwear industry and hence it is very important to analyse the problems arising out of it and ensure the remedial measures.

B. SELECTION OF THE SAMPLE

i) SELECTION OF THE SAMPLE COUNTRIES

The major exporting and importing countries were selected as sample countries based on volume of trade in textile and clothing. It includes exporting countries namely Bangladesh, China, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Vietnam, Cambodia and importing countries namely USA, Australia, Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and UK.

ii) SELECTION OF THE SAMPLE FOR FIELD INVESTIGATION

Sample units were drawn from Tirupur, the well-known textile hub of India, has more than 5,000 garment manufacturing and job work units in the district. Tirupur is the biggest Centre for exports of knitwear in India and seen as one of the most dynamic garment clusters in the “developing” world. Nearly 6 lakh people of Tirupur are dependent for livelihood on garment manufacturing and related industries. In fact, when the textile industry was booming, Tirupur was portrayed as ’Dollar City’ and ’Little Japan’ by media. From Tirupur 55 percent to 60 percent of exports are targeted at the European market and 30 percent at US market. On the basis of the achievement of the city, it was selected as the study area.
In Tirupur, hosiery units consists of knitting units, knitted garment making units, dying and bleaching units, fabric printing units, embroidery units, compacting and calendaring units and other ancillary units. In Tirupur, more than 90 per cent of the knitting and knitted garment units are export oriented units. It contributes to 80 per cent of the country's cotton hosiery exports.

Hence the sample hosiery units were selected by adopting a convenient sampling method from the cluster of organizations like Sole Proprietorship, Partnership Firms, Private Limited Companies and Public Limited Companies. There were 702 registered life member exporters as per Tirupur Exporter's Association latest report (2012, December). Two hundred and ten exporters were selected as a sample population i.e., 30 percent, of the total population was contacted. On the final leg of data collection, it was found that out of 210 questionnaires distributed 30 were observed to either partly unfilled or missing out certain crucial information. Thus, this limited the sample size of the 180 exporters. These were found fit for analysis, making it a response rate of 86 percent. Such response rate is considered to be satisfactory for this type of sampling frame.

C. DATA BASE OF THE STUDY

Time series data were drawn from WTO statistical data base for the period 1995 to 2011. It was split into various stages for quota liberalization such as I, II, III, IV and a separate period for global economic crisis. They were described as follows:

1. Stage-I of quota elimination (16%) covering the period from 1995-1997.
2. Stage-II of quota elimination (17%) covering the period from 1998-2001.
3. Stage-III of quota elimination (18%) covering the period from 2002 - 2004.
4. Stage-IV of quota elimination (49%) covering the period from 2005-2007 and
MAP OF TIRUPUR DISTRICT
The required primary data from hosiery exporters of Tirupur were collected between December 2012 and January 2013. The primary data were collected through the discussion with the executives of the Tirupur Exporters’ Association (TEA), through the issue of a questionnaire to elicit the data from the 180 respondents from knitwear exporters. The researcher visited the export units and handed over the questionnaire to the concerned units in person in most of the occasions, questionnaires were filled in the presence of the researcher. While filling up the questionnaires, many exporters shared their opinion with the researcher. This helped the researcher to have a deeper insight into the impact of quota liberalization and global economic crisis in all respects. These were found fit for analysis, making it a response rate of 59 percent. Such response rate is considered to be satisfactory for this type of sampling frame.

D. THEORETICAL UNDERPINNINGS

a) REVEALED COMPARATIVE ADVANTAGE/REVEALED COMPETITIVE ADVANTAGE

In economics, comparative advantage refers to the ability of a party to produce a particular good or service at a lower marginal and opportunity cost over another. Even if one country is more efficient in the production of all goods (absolute advantage in all goods) than the other, both countries will still gain by trading with each other, as long as they have different relative efficiencies.

The idea of comparative advantage has been first mentioned in Adam Smith’s Book the Wealth of Nations: "If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage." But the law of comparative advantages has been formulated by David Ricardo who investigated in detail advantages and alternative or relative opportunity in his 1817 book on the Principles of Political Economy and Taxation in an example involving England and Portugal.
Classical comparative advantage theory was extended in two directions: Ricardian theory and Heckscher-Ohlin-Samuelson theory (HOS theory). In both theories, the comparative advantage concept is formulated for 2 countries, 2 commodity cases. It can easily be extended to the 2 country, many commodity cases or much country, 2 commodity cases. But in the case with many countries (more than 3 countries) and many commodities (more than 3 commodities), the notion of comparative advantage loses its facile features and requires totally different formulation.

This simple analysis becomes very difficult and even impossible when trade takes place among many countries and many commodities. To overcome this restriction Balassa (1965 & 1977) developed an index of “Revealed Comparative Advantage”. Vollrath (1987) is among the earliest researchers to distinguish between comparative advantage and competitive advantage. He argued that comparative advantage is applied to efficient, well-functioning and undistorted prices in markets. In case, if distortions exist competitive advantage is considered better to use.

Vollrath (1987 and 1991) and White (1987) were of the view that true measure of performance in global markets is competitive advantage rather than comparative advantage. Vollrath (1987 and 1991) has introduced revealed competitive index that takes into account a country’s exports as well as imports relative to the rest of world’s export and import of a particular commodity under neo-classical framework. White (1987) has used revealed competitive advantage to measure changes in competitiveness of US agricultural trade. His method is an extension of Balassa’s method and in nature similar to Vollrath’s revealed competitive index. Revealed competitive advantage measure has also been used in some other empirical studies to measure economic and export performance. In view of growing outsourcing and global procuring, it is necessary to extend the theory to the case with traded intermediate goods. This was done in Shiozawa’s 2007 new trade theory (NTT).

Until now, this is the unique general theory which accounts for traded input goods. It is a collection of economic models in international trade which
focuses on the role of increasing returns to scale and network effects, which were developed in the late 1970s and early 1980s. New trade theorists relaxed the assumption of constant returns to scale, and some argue that using protectionist measures to build up a huge industrial base in certain industries will then allow those sectors to dominate the world market. Less quantitative forms of a similar "infant industry" argument against totally free trade have been advanced by trade theorists since at least 1848. However, this study applies both the Balassa index for revealed comparative advantage and the White index for revealed competitive advantage to analyze the export/import performance of major exporting countries.

**b) INTRA-INDUSTRY / INTER INDUSTRY TRADE (IIT)**

For more than four decades theoretical and empirical researchers in the field of international trade have been keenly interested in two-way trade of products belonging to the same industry that is intra-industry trade (IIT), with theories of comparative advantage, or Heckscher-Ohlin factor endowment focusing on inter-industry trade. Ricardo’s comparative advantage model states that countries with different comparative advantages engaging in trade will profitably benefit from it. The Heckscher-Ohlin model describes the basis of comparative advantage in terms of factor endowments. A country will export a commodity which utilizes its abundant factor and import a commodity which utilizes its scarce factor.

Both types of trade models assume that goods traded are homogeneous, and that a country will therefore either only export goods within the same industry, or only import these goods, but not simultaneously export and import goods within the same industry. However, a large portion of the output of modern economies involves differentiated rather than homogeneous products of the same industry that is intra-industry trade as opposed to inter-industry trade in completely different products. Therefore, conventional trade theories are deficient in this respect and cannot explain this type of emerging trade pattern. After the pioneering study of Grubel and Lloyd (1975) the initial key contributions in the theory of IIT study include Krugman (1979), Lancaster (1980) and Brander (1980).
Instead of specialization in an entire industry or activity, that is, inter-industry specialization, intra-industry specialization involves a country specializing in a narrow range of products within a given industry. Another corollary of IIT theory is related to economies of scale, principally because IIT occurs when each country with economies of scale produces only a limited range of products within an industry. Thus, IIT represents a simultaneous movement towards specialization in separate differentiated goods and achieves economies of scale in production, and thereby leads to two-way trade in products similar enough to be grouped in the same industry in standard industry classification schemes.

As Krugman and Obstfeld (1988) pointed out, IIT with these features produces extra gains from international trade because it creates a larger market. As a consequence, this suggests that a country engaged in a narrower form of specialization can via IIT increase both productivity and the variety of goods available to domestic consumers.

The IIT phenomenon was first considered empirically when a group of European countries formed the European Common Market, which has now grown into the European Union and currently consists of twenty eight countries. A large number of theoretical and empirical studies have been conducted to measure the size and importance of IIT, and also to investigate the determinants of it since that time. In addition to the desirable welfare effects mentioned before, trade analysts also noted another positive aspect of IIT from the investigation of the European experience after the formation of the EC, namely, the adjustment cost of economic integration.

The proposition is that intra-industry trade increases as a nation’s economy develops has found general support and is now widely accepted. Accordingly, the bulk of empirical studies have focused on the IIT of developed countries. However, an increasing number of studies have also been done on developing country IIT, or on the IIT between developed and developing countries. Some of the studies in attempting to identify the determinants of IIT have focused on country-specific determinants while others have concentrated on industry-specific ones.
However, there are some studies which focus on both types of determinants. IIT studies in recent times have also estimated the extent of horizontal and vertical intra-industry trade and identified their determinants. In this study the investigator estimated the extent of intra-industry trade stage wise in textile and clothing trade taking into account the major importers and exporters worldwide. By estimating Grubel-Lloyd Index, the Grubel–Lloyd index measures intra-industry trade of a particular product. It was introduced by Herb Grubeland Peter Lloyd in 1971. Several alternative measures has been developed in the literature to estimate the degree of Intra-Industry Trade (IIT). To measure the extent of IIT, this study uses the most widely preferred index, Grubel-Lloyd (G-L). This index measures intra-industry trade as a percentage of a country’s total trade which is assumed to be balanced, that is exports equal imports.

F. TOOLS OF ANALYSIS

1. TESTS OF UNIT ROOT

In the present study non-stationarity or the presence of a unit-root was tested using Dickey–Fuller test and Augmented Dickey Fuller test.

a. DICKEY–FULLER (DF) TEST

The testing procedure for DF test is based on the following model.

\[ y_t = \rho y_{t-1} + u_t \]

Where \( y_t \) is the variable of interest, \( t \) is the time index, \( \rho \) is a coefficient, and \( u_t \) is the error term. A unit root is present if \( \rho = 1 \). The model would be non-stationary in this case.

b. AUGMENTED DICKEY FULLER (ADF) TEST

The testing procedure for the ADF test is the same as for the Dickey–Fuller test but it is applied to the model

\[ \Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t, \]

Where \( \alpha \) is a constant, \( \beta \) the coefficient on a time trend and \( P \) the lag order of the autoregressive process. Imposing the constraints \( \alpha = 0 \) and \( \beta = 0 \) corresponds to modeling a random walk and using the constraint \( \beta = 0 \) corresponds to modeling a random walk with a drift.
By including lags of the order $p$ the ADF formulation allows for higher-order autoregressive processes. This means that the lag length $p$ has to be determined when applying the test. One possible approach is to test down from high orders and examine the $t$-values on coefficients. An alternative approach is to examine information criteria such as the Akaike information criterion, Bayesian information criterion or the Hannan-Quinn information criterion. The unit root test is then carried out under the null hypothesis $r=0$ against the alternative hypothesis of $r<0$. Once a value for the test statistic is found, this test was done by making use of the software microfit for windows 4.0.

2. COMPOUND ANNUAL GROWTH RATE (CAGR)

Compound Annual Growth Rate (CAGR) is an average growth rate over a period of several years. It is a geometric average of annual growth rates. The compound growth rate was calculated by applying the following formula for the data relating to world trade in imports and exports of textile and clothing combining the period quota liberalization and global Economic crisis. The formula is as follows.

$$
\hat{B} = \frac{yt - \frac{(\Sigma y^2)(\Sigma t)}{n}}{\frac{\Sigma t^2}{n}}
$$

$\hat{B} =$ Compound growth rate
$y =$ Variables under study (exports and imports)
$\Sigma t =$ Summation of time (1,2,3,--------n)
$n =$ Total number of years

3. BALASSA’S REVEALED COMPARATIVE ADVANTAGE (BRCA) INDEX

This section is classified into two sub-sections. The former subsections analyses the BRCA in exports, while the latter focuses on the import scene. This will thus enable a complete picture of the BRCA scene over a period of time. An analysis of BRCA in imports gains importance due to the policies of liberalization adopted worldwide which will have an impact on the pattern of imports of the country. The study utilizes the Balassa (1965) measure of computing the RCA index. Asper the measure comparative advantage is
‘revealed’ by the relative export/import performance of individual product categories. Thus, the study is based on export and import data covering 17-years period from 1995 to 2011.

The index for country i commodity j is calculated as follows:

$$BRCA_{ij} = \frac{(X_{ij}/X_{wj})}{(X_i/X_w)}$$

Where

- $BRCA_{ij}$ = Revealed comparative advantage of the ith country’s, jth industry,
- $X_{ij}$ = Merchandise exports of the jth industry by the ith country,
- $X_{wj}$ = World merchandise exports of the jth industry,
- $X_i$ = Total merchandise exports of the ith country,
- $X_w$ = Total merchandise world exports.

In order to get a complete picture of India’s comparative advantage the import counter-part is also computed following (Lim 1997). Hence,

$$BRCA_{ij} = \frac{(M_{ij}/M_{wj})}{(M_i/M_w)}$$

Where,

- $BRCA_{ij}$ = Revealed comparative advantage of the ith country’s, jth industry,
- $M_{ij}$ = Merchandise imports of the jth industry by the ith country,
- $M_i$ = Total merchandise imports of the ith country,
- $M_{wj}$ = World merchandise imports of the jth industry,
- $M_w$ = Total merchandise world imports.

If the BRCA index for a particular industry is greater than 1, it implies that the country has a revealed comparative advantage in the exports/imports of that industry and vice-versa. A positive value of BRCA might be interpreted as an indication of comparative advantage. The BRCA is measured using post-trade data. The advantage of using the comparative advantage index is that it considers the intrinsic advantage of a particular export/import commodity and is consistent with changes in an economy’s relative factor endowment and
productivity. Balassa’s Revealed Comparative Advantage (BRCA) was applied in the studies of Mokhtarul Wadud, (2007), Burange Sheetal J Chaddha (2008), Richardson and Zhang (1999), Widgren (2005), Muhammad Ilyas et al. (2009) and Darvar and Bhupinder Singh (2013).

4. THEORETICAL RANGE OF THE BALASSA RCA VALUES

Values to provide a more even distribution of the BRCA scores, Hinloopen and Van Marrewijk (2001) have divided the theoretical range of the Balassa Indices.

The BRCA values into four classes are as follows.

<table>
<thead>
<tr>
<th>BRCA Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class ‘a’ 0 &lt; BRCA &lt; 1</td>
</tr>
<tr>
<td>Class ‘b’ 1 &lt; BRCA &lt; 2</td>
</tr>
<tr>
<td>Class ‘c’ 2 &lt; BRCA &lt; 4</td>
</tr>
<tr>
<td>Class ‘d’ 4 &lt; BRCA</td>
</tr>
</tbody>
</table>

5. WHITE’S REVEALED COMPETITIVE ADVANTAGE (WRCA) INDEX

This method is an extension of Balassa’s method. It takes into account and import demand of a specific commodity for a country. Its advantage is that it uses both export and import data and competitive advantage is determined by both supply and demand. The revealed competitive advantage is calculated as the difference between revealed comparative export share for commodity j and revealed comparative import share for commodity j. Therefore the White’s index provides the results of net comparative advantage (unlike Balassa’s approach which only takes into the account of exports). The index is calculated as:

\[ WRCA_{ij} = RCS_{ij} - RCD_{ij} \]

\[ WRCA_{ij} = \frac{RX_{ij}}{X_{wij}} - \frac{MI_{ij}}{M_{wij}} \]

Where \( WRCA_{ij} \) is revealed competitive advantage of country i for commodity j, \( RCS_{ij} \) is the ratio of country i’s share of commodity j to its share in total world exports, \( RCD_{ij} \) is the ratio of country i’s share of commodity j to its share in total world imports, \( MI_{ij} \) is import of commodity j by country i, \( M_{wij} \) is...
total world imports of commodity \( j \), \( M_i \) total world imports of country \( i \), \( M_{wi} \) total world imports. If \( WCA_{ij} > 0 \) and \( BRCA_{ij} > 1 \), then the results of both the models are identical and will show that the country has an advantage in exports of commodity \( j \) and vice versa. Muhammad Ilyas et.al (2009) and Darvar and Bhupinder Singh (2013) have applied this tool in their study.

6. GRUBEL–LLOYD (G-L) INDEX

For an individual product group or industry \( i \) the share of IIT is formulated as

\[
GL_i = 1 - \left| \frac{X_i - M_i}{X_i + M_i} \right|
\]

Where \( X_i \) and \( M_i \) stand, respectively, for the exports and imports of industry \( i \). If all trade was balanced \( GL_i \) would equal 1. On the other hand, if all trade was one-way, \( GL_i \) would equal zero. Thus, the closer \( GL_i \) is to 1 (that is, \( X_i = M_i \)), the more trade in industry \( i \) is intra-industry trade. The closer \( GL_i \) is to zero (that is, either \( X_i = 0 \) or \( M_i = 0 \)), the more trade in industry \( i \) is inter-industry trade. Therefore, the index of intra-industry trade takes values from 0 to 1 as the extent of intra-industry trade increases, that is, \( 0 \leq GL_i \leq 1 \). If \( GL_i = 1 \), there is only intra-industry trade, no inter-industry trade. Conversely, if \( GL_i = 0 \), there is no intra-industry trade, only inter-industry trade.


7. GROWTH OF THE VARIABLES-STAGE WISE

In order to calculate stage-wise growth from the beginning of the period over the end of the period of that particular stage, the following formula was applied
Gr = \frac{V_t - V_{t-1}}{V_{t-1}}

Gr = Growth of the variable

V_t = Value in the current period

V_{t-1} = Value in the base period of each stage

8. SUMMATED SCALES (LIKERT’S SCALES)

For primary data analysis summated scales (or Likert’s scales) were developed by utilizing the item analysis approach where in a particular item is evaluated on the basis of how well it discriminates between those persons whose total score is high and those whose score is low. In a Likert’s Scale, the respondent was asked to respond to each statement in terms of several degrees, usually three and five degree of agreement (or) disagreement. In this research work each point on the scale carries a score of 5, 4, 3, 2, 1 and 5, 4, 3, 2, and 1. scaling describes the procedure of assigning numbers to various degrees of opinion, attitude and other concepts.

9. KAISER-MEYER-OLKIN AND BARTLETT’S TEST

Kaiser-Meyer-Olkin and Bartlett’s test of sphericity measure of sampling adequacy is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. Large values for the KMO measure indicate that a factor analysis of the variables is a good idea. Another indicator of the strength of the relationship among variables is Bartlett’s test of sphericity. Bartlett’s test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated.

10. ROTATION FACTOR ANALYSIS.

The factor analysis is another multivariate technique. It is an extremely powerful and useful analytic approach to psychological, behavioral, financial and other types of data. It is a statistical technique for determining the
underlying factors or forces among a large number of interdependent variables of measures. It is a method for extracting common factor variances from a set of observations. It groups the number of variables of smaller set of uncorrelated factors potentially conveying a great deal of information. The formula applied is as follows:

\[ F_k = w_{1k}X_1 + w_{2k}X_2 + w_{3k}X_3 + \ldots + w_{ik}X_i + \ldots + w_{nk}X_n \]

Where \( w_{1k} \) is the weight of the original variable \( X_i \) in the linear composite of the factor \( k \).

\[ F_k = \sum_{i=1}^{n} w_{ik}X_i \]

\[ k= 1,2,3,\ldots,n \]

The above formula for \( F_k \) can be used to find the scores of each set of observations (each row) for the factor \( k \) by substituting the values of \( X_i \), \( i = 1,2,3,\ldots,n \) in it.

a) Correlation Coefficient Matrix: It is the matrix of correlation of the original observation between different pairs of input variation.

b) Factor: A factor is an underlying dimension that account for several observed variables. There can be one or more factors, depending upon the nature of the study and the number of variables involved in it.

c) Factor –Loading: Factor-loading is those values which explain how closely the variables are related to each one of the factors discovered. They are also known as factors-variable correlations. In fact, factor-loadings work as key to understanding what the factors mean. It is the absolute size (rather than the signs, plus or minus) of the loading that is important in the interpretation of a factor.

d) Communality(\( h^2 \)): Communality, symbolized as \( h^2 \), shows how much of each variable is accounted for by the underlying factors taken together. A high value of communality means that not much of the variable is left
over after whatever the factors represent is taken into consideration. It is worked out in respect of each variable as under:

\[ h_i^2 = \sum_{j=1}^{n} L_{ij}^2 \]

e) **Eigen Value:** Eigen value (or Latent Root) is the sum of squared values of factor loadings relating to a factor. It indicates the relative importance of each in accounting for the particular set of variables under study. It is given as

\[ j = \sum_{i=1}^{n} L_{ij}^2 \]

f) **Total Sum of Squares:** When Eigen values of all factors are totaled, the resulting value is called the total sum of squares. Rotations reveal different structures in the data. If the factors are independent, orthogonal rotation is done, and if they are corrected, an oblique rotation is made. Factor score represents the degree to which each respondent gets high scores on the group of item that load high on each factor. Factor scores are used in several other multivariate analysis.

11. RELIABILITY TEST  - CRONBACH’S ALPHA

Cronbach’s \( \alpha (\text{alpha}) \) is a coefficient of internal consistency. In statistics and research, internal consistency is typically a measure based on the correlations between different items on the same test (or the same subscale on a larger test). It measures whether several items that propose to measure the same general construct produce similar scores. It is commonly used as an estimate of the reliability for a sample of examinees. The standardized Cronbach’s alpha can be defined as

\[ \alpha_{\text{standardized}} = \frac{K\bar{r}}{1 + (K-1)\bar{r}} \]
Where \( K \) is as above and \( \bar{r} \) the mean of the \( K(K-1)/2 \) non-redundant correlation coefficient (i.e., the mean of an upper triangular, or lower triangular, correlation matrix).

Cronbach's \( \alpha \) is related conceptually to the Spearman-Brown prediction formula. Both arise from the basic classical test theory classical test theory result that the reliability of test scores can be expressed as the ratio of the true-score and total-score (error plus true score) variances:

\[
\rho_{XX} = \frac{\sigma^2_T}{\sigma^2_X}
\]

The theoretical value of alpha varies from zero to 1, since it is the ratio of two variances. However, depending on the estimation procedure used, estimates of alpha can take on any value less than or equal to 1, including negative values, although only positive values make sense. Higher values of alpha are more desirable. Some professionals, as a rule of thumb, require a reliability of 0.70 or higher (obtained on a substantial sample) before they will use an instrument.

**12. TOLERANCE AND VIF**

To assess multi-collinearity one looks at the size of tolerance and VIF (Variance Inflated Factor). For the tolerance small indicate the absence of collinearity. The VIF is the inverse (opposite) of tolerance, one looks for large values. If the tolerance value is smaller than .10, it is concluded that multi-collinearity is a problem. Similarly, if the VIF is 5 or larger, then multi-collinearity is a problem.

**13. MULTIPLE REgressions MODELS**

Multiple regression models were applied to analyse the opinion based impact on both quota elimination and global economic crisis.
a) **MULTIPLE REGRESSION MODEL I:**

The multiple regression model was performed to evaluate exporter’s opinion on quota liberalization based on the positive opinions such as changes in buyer-seller relationship, adhering to quality standards, effectiveness in order processing, catering to fashion demands, timely supply, lead times, attitude of employees has changed because of liberalization and shift in labor and capital in production was easy as dependent variables and the average quality indices (opinion on quota liberalization) as dependent variable. The model is as follows.

\[ QL = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \ldots + \alpha_8 X_8 + e \]

Where, QL = Average quality index derived based on aggregate exporter’s opinion on quota liberalization, \( \alpha_0 \) is constant and \( \alpha_1, \alpha_2, \alpha_3, \ldots \) are coefficients of the estimates and e is the error term, which the author assumed it as NID for this research.

b) **MULTIPLE REGRESSION MODEL II:**

The multiple regression model was performed to evaluate the impact of exporter’s opinion about global economic crisis considering negative opinions such as instability of US dollar values, reduction in export realization, decrease in production, decrease in employability, decrease in investment, slowdown in global demand, increase in cost of imports, cut expenditures (on machinery & equipment, on buildings, on training on R&D), cancel extra work in firm, transfer of workers to other firms, laying off temporary workers, wage reductions, energy crisis and inflation as independent factors and the average quality indices (opinion on global economic crisis) as dependent variable. The model is as follows:

\[ GEC = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_{15} X_{15} + e \]

Where,

\( GEC \) = Average quality index based on aggregate exporter’s opinion about Global Economic Crisis

\( X_1, X_2, X_3, \ldots, X_{15} \) are co-efficients of independent factors
\[ \beta_0 \text{ is constant co-efficient, } \beta_1, \beta_2, \beta_3, \ldots, \beta_{15} \text{ are coefficients of the estimate, and } 'e' \text{ is the error term, which the authors assumed it as NID for this research.} \]

14. OTHER TOOLS

Other than the above mentioned tools, percentages and bar diagrams were used to analyse the data.

G. CONCEPTS AND DEFINITIONS USED FOR THE STUDY

Simple conceptual meanings of the various technical terms used in the study are:

i) **Quota**: Quota is non-tariff barrier imposed by importing country to restrict the dumping of foreign products in their markets. Quota is a quantitative, fixed on the bases of bilateral agreements signed between countries.

ii) **Quota Elimination**: Quota elimination refers to an initiative to eliminate the use of quotas in all textile and clothing trade between nations which are members of the World Trade Organization (WTO). Doing so was one of the key commitments undertaken at the WTO Uruguay Round in 1994. The ATC, that is the WTO Agreement on Textile and Clothing, is the regulation governing textile and clothing and implements this commitment.

iii) **Quota Allocation**: Many governments also regulate imports by means of quotas, regulations that control the quantity imported merchandise. Quotas are negotiated agreements between two trading countries and are allocated for a 12 month period. Before considering overseas sourcing (finding production), a manufacturer or importer must be sure that there is enough quota to allow the merchandise in question to be produced in that country. Frequently, all the allocations are already "held" (controlled) by manufacturers or by government in a given country.

iv) **Non-Tariff Barriers to Trade (NTBs)** is trade barriers that restrict import but are not in the usual form of a tariff. Some of non-tariff barriers are not directly related to foreign economic regulations but nevertheless have a significant impact on foreign-economic activity and foreign trade between countries. Non-tariff barriers to trade include import quotas, special licenses, unreasonable
standards for the quality of goods, bureaucratic delays at customs, export restrictions, limiting the activities of state trading, export subsidies, countervailing duties, technical barriers to trade, sanitary and photo-sanitary measures, rules of origin, etc. Sometimes in this list they include macroeconomic measures affecting trade.

v) Economic Crisis: A situation in which the economy of a country experiences a sudden downturn brought on by a financial crisis. An economy facing an economic crisis will most likely experience a falling GDP, a drying up of liquidity and rising/falling price due to inflation/deflation. An economic crisis can take the form of crisis or a depression. Also called real economic crisis.

vi) Global Economic Crisis: Global economic crisis refers to an economic scenario where the economies all over the world have taken a beat.

vii) Supply Chain: refers to the complex network of relationships that organizations maintain with trading partners to procure manufacture and deliver products or services. Supply chain encompasses the facilities where raw materials, intermediate products and finished goods are acquired, transformed, stored and sold.

viii) Financial Crisis: A situation in which the value of financial institutions or assets drops rapidly. A financial crisis is often associated with a panic or a run on the banks, in which investors sell off assets or withdraw money from savings accounts with the expectation that the value of those assets will drop if they remain at a financial institution.

ix) Hosiery Products: Hosiery products is a generalized name given to all knitted apparel products and it include all types of knitted and crocheted apparels and clothing accessories as covered under ITC HS code 61 (6101 to 6117). The harmonized system (HS) of commodity classification developed by World Custom Organization, Brussels has been in use in world over since the late 1980s. India being member of World Custom Organization adopted this classification of commodities for imposition for custom duty.

x) World Trade Organization: The World Trade Organization (WTO) is the most powerful body for controlling the dynamics of global trade. It has the power to
enforce its rules through sanctions and helps in the formulation of trade agreements between various countries. It also oversees that agreement terms are adhered to by the participating countries and resolves disputes.

**xi) Multi Fibre Arrangement (MFA):** The Multi Fibre Arrangement governed the world trade in textiles and garments from 1974 through 2004, imposing quotas on the amount developing countries could export to developed countries. It expired on 1 January 2005. The MFA was introduced in 1974 as a short-term measure intended to allow developed countries to adjust to imports from the developing world. Developing countries have a natural advantage in textile production because it is labor intensive and they have low labor costs.

**15. LIMITATIONS OF THE STUDY**

One of the major limitations of the study is that the reference period was restricted to 1995-2011, since the latest data of WTO statistical base were available up to this period for the trade performance of major countries. For certain countries and periods non-availability of data were observed. The exports are carried out to a larger extent from different parts of the country like Mumbai, Ludhiana, Delhi, and Bangalore and the like whereas this study is restricted to Tirupur town located in India alone based on the assumption that the effects of quota liberalization and global economic crisis will be same everywhere. The researcher tried to attain cent percent accuracy while collecting data from the respondents. But it may vary due to the lesser number of respondents selected for data collection instead of the entire population. While analyzing the impact of quota liberalization only positive aspects were taken into account while negative impacts were also largely prevailed during this period. The findings of the study relating to the impact of global economic crisis depend upon the memory power of the respondents.

Despite these limitations, the findings of the study were indicative of the impacts in the field of study and provide scope for further research in the near future.